

RHOMBOGNATHINAE (ACARI: HALACARIDAE) FROM THE GREAT BARRIER REEF, AUSTRALIA

I. BARTSCH

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Samples from tidal and subtidal zones from the Great Barrier Reef area off eastern Australia contained one species of *Isobactrus* and 11 of *Rhombognathus*. Three of these 12 rhombognathine species, *Isobactrus ponapensis* Abé, *Rhombognathus papuensis* Bartsch, and *R. scutulatus* Bartsch, have been recorded previously from areas outside eastern Australia. The nine species *R. cyrtanotus* sp. nov., *R. delicatulus* sp. nov., *R. lathridius* sp. nov., *R. levigatus* sp. nov., *R. longipes* sp. nov., *R. reticulifer* sp. nov., *R. seminotatus* sp. nov., *R. terculus* sp. nov. and *R. validipes* sp. nov. are described. A key is given to the eastern Australian rhombognathines. □ *Eastern Australia, Great Barrier Reef, Halacaridae, rhombognathines, new records, new species, descriptions, key.*

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Rhombognathine mites inhabit intertidal and shallow subtidal substrata and marine and brackish waters. Rhombognathines are algivorous, accordingly they are found either on algal fronds or on substrata with epiphytes. Two rhombognathine genera, *Rhombognathus* and *Isobactrus*, are widely spread in the Pacific. To date, 34 species of *Rhombognathus* and nine of *Isobactrus* are recorded from the western Pacific (Abé, 1998; Bartsch, 1999). Still the fauna of large areas is unknown, especially that of the Great Barrier Reef. To fill this gap of knowledge, J.C. Otto took numerous samples in the Great Barrier Reef Marine Park which later proved to contain 12 rhombognathine species, representing two genera (*Isobactrus* – 1 species and *Rhombognathus* – 11 species). Three of these species had been recorded previously, the others are new to science.

MATERIAL AND METHODS

The rhombognathine mites from the Great Barrier Reef Marine Park area were collected and sorted by J.C. Otto. Australian Institute of Marine Science, Townsville.

The mites were cleared in lactic acid and mounted in glycerine jelly. Holotypes are deposited in the Museum of Tropical Queensland, Townsville (MTQ), paratypes and voucher specimens in the MTQ, the Queensland Museum, Brisbane (QM), the Western Australian Museum, Perth (WAM), the Zoological Institute and Zoological Museum, Hamburg (ZMH), and the author's halacarid collection (IB).

Abbreviations used: AD = anterior dorsal plate; AE = anterior epimeral plate; AP = anal

plate; ds-1 to ds-5 = first to fifth pair of dorsal setae; E = epimera, numbered I to IV; GA = genitoanal plate; GO = genital opening; GP = genital plate; OC = ocular plate(s); P = palp, P-2 to P-4 = second to fourth palpal segment; pas = parambulacral setae; PD = posterior dorsal plate; PE = posterior epimeral plate(s); pgs = perigenital setae, numbered 1 to 5 from anterior to posterior; sgs = subgenital setae. Legs numbered I to IV, leg segments 1 to 6 are trochanter, basifemur, telofemur, genu, tibia and tarsus.

Drawings were prepared with a camera lucida. Unless stated otherwise, adjunct and adanal setae are shown either in dorsal or in ventral aspect.

Length of the idiosoma is that from the anterior margin of the AD to the end of the anal valves. The length of the PD includes the pair of posteriorly projecting cones. The position of a seta is given in a decimal system, with reference to the length of a plate from the anterior to posterior margin; the position of the legs with reference to the length of the idiosoma. The length of a leg segment is that along the dorsal margin. In the setation formula of the legs, the number of pas, solenidia and famuli is excluded. Unless stated otherwise, the setation formula of the telofemora presents the number of dorsal/ventral setae. Measurements in micrometres unless otherwise stated.

In *Rhombognathus*, the number of adjunct setae on the AE and PE, the number of perigenital setae and the setation on the legs is known to vary. Each description is supplemented with notes on, generally unilateral, variants; the number of cases are in parentheses.

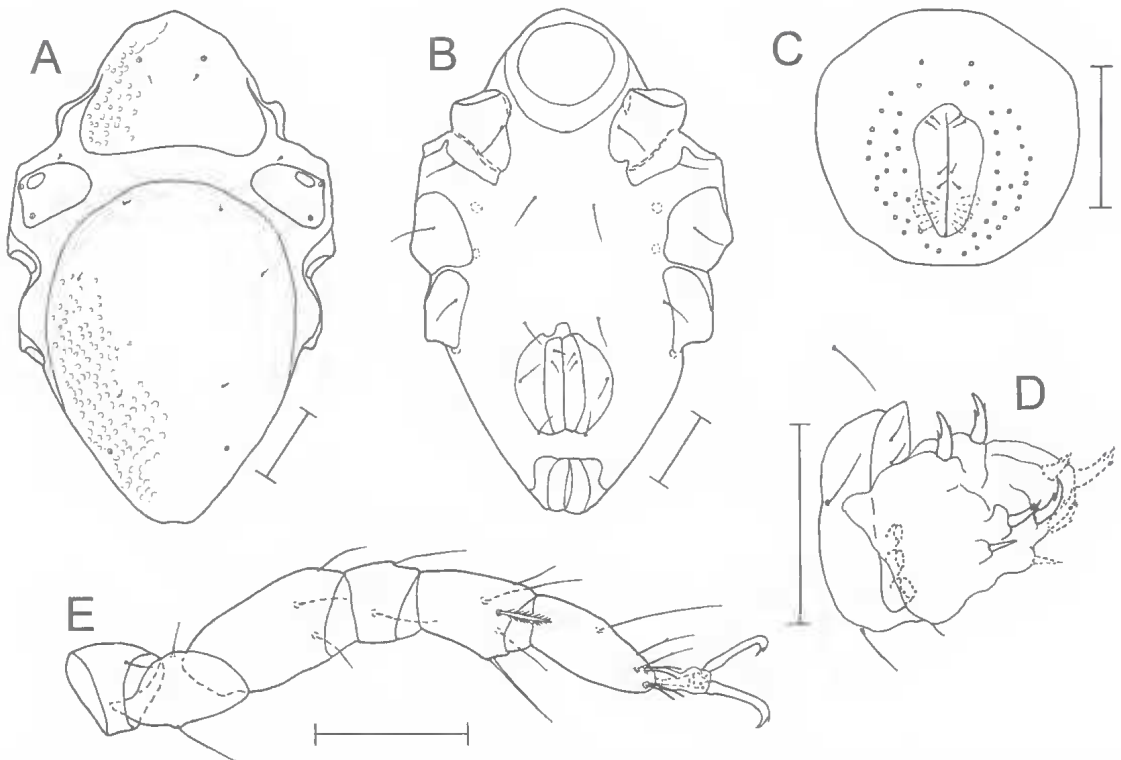


FIG. 1. *Isobacterus ponapensis* Abé, 1996; A, idiosoma, dorsal, male; B, idiosoma, ventral, female; C, genitoanal plate, male; D, ovipositor, female (genital spines of left half dashed); E, leg I, ventromedial, female. Scale bar = 50 μ m.

SYSTEMATICS

RHOMBOGNATHINAE Viets, 1927

Isobacterus Newell, 1947

TYPE SPECIES (by original designation). *Isobacterus setosus* (Lohmann, 1889) = *Aletes setosus* Lohmann, 1889.

DIAGNOSIS. Dorsal plates AD, OC and PD present, sometimes fused. AD with pair of setae. OC with 0 (rarely 1) setae, 2 gland pores and 0-1 corneae. PD (or area representing PD) with 1-3 pairs of setae. Adanal setae absent. Ventral plates reduced, epimera I and II rarely fused in the median; epimera III with 1-2 setae, epimera IV with 1 seta which may insert within the striated integument. Genital plate not fused with anal plate. Females with 3(-4) pairs of pgs; males with 32-98 pgs. Gnathosoma short, generally concealed in dorsal aspect. Both pairs of maxillary setae on rostrum. Palps 4-segmented. P-2 with 1 seta; P-3 without seta; P-4 with 3 (rarely 4) basal setae. Legs shorter than idiosoma. Tibiae I and II each with a pair of ventral setae; generally 1 seta bipectinate and 1 seta smooth.

Tarsi I, II and IV with 3 dorsal setae each (one species with 4 setae), tarsus III generally with 4 setae, rarely with 3 or 5. Tarsi lack ventral setae. Solenidion on both tarsus I and II dorsolateral in position. Tarsi I-IV each with carpite (rod-like sclerite) between end of tarsus and central sclerite. Central sclerite lacks tine-like process. The 2 claws smooth or with tines.

Isobacterus ponapensis Abé, 1996 (Fig. 1)

Isobacterus ponapensis Abé, 1996: 17-24, figs 1-4.

MATERIAL. ♀, ♂, 1 tritonymph (MTQ), Great Barrier Reef, Long Island, Whitsundays, sand at 0.5m, 28 February 1997; coll. J.C.Otto. ♀, 1 tritonymph (QM S50961), collection data as above. ♀ (1B), collection data as above.

DESCRIPTION. Idiosoma of female 322-335 long, of male 332. Gland pore on AD immediately anterior to ds-1 (Fig. 1A). OC wider than long. PD large, marginally foveate, reaching between OC. Setae ds-2 within striated integument. Setae ds-3 to ds-5 on PD, ds-3 and ds-4 anterior and level with insertion of leg III, ds-5

posterior to the level of leg IV. Epimera I and II with a seta each. Epimera III and IV separated by striated integument (Fig. 1B); EIII with ventral seta; succeeding seta within margin of EIV. Female GO surrounded by plate; anterior pair of pgs within striated integument, succeeding 2 pairs of pgs on and in margin of genital plate, respectively. Genital sclerites with 2 pairs of sgs. Ovipositor with 10 well-sclerotised genital spines (Fig. 1D); 2 pairs each anteroapically and posteroapically, the latter followed by pair of spiniform genital spines. Two pairs of anteroapical genital spines large, equal in size, each with median process flanked by 2 small tines. Posteroapical genital spines in shape similar to but slightly smaller than anteroapical pairs of genital spines. Male GP with 49 pgs; genital sclerites with 4 pairs of sgs (Fig. 1C). Gnathosoma slightly wider than long. Legs shorter than idiosoma. Leg chaetotaxy from trochanter to tarsus: legs I and II, 1, 2, 3, 2, 5, 3; leg III, 1, 1, 2, 2, 4, 4; leg IV, 0, 1, 2, 1, 4, 3. Ventromedial seta on tibia I (Fig. 1E) and II bipectinate. Apical pair of fossary setae delicately furcate. Carpite between tip of tarsus and central sclerite solid. Accessory process on claws with single tooth.

Idiosoma of tritonymph 272-278. Setae ds-2 and ds-3 within striated integument. Arrangement of gland pores as in adults. Small genital plate with pair of subgenital setae and pair of perigenital setae, another pair of pgs within striated integument. Shape and setation of legs same as in adults.

REMARKS. *Isobactrus ponapensis* was described originally on the basis of females, males and juveniles from Ponape, Micronesia (Abé, 1996). The individuals from the Great Barrier Reef are larger than the adults from Micronesia which have an idiosomal length of 255-280, and there are small differences in the insertion of the three pairs of setae on the PD — in the adults from the Great Barrier Reef the interval between ds-3 and ds-4 is shorter than between ds-4 and ds-5, in those from Micronesia the distance ds-3 to ds-4 and ds-4 to ds-5 is almost the same.

The ovipositor of *Isobactrus ponapensis* bears 10 genital spines whereas the Northern Atlantic species *I. setosus* (Lohmann, 1889) and *I. uniscutatus* (Viets, 1939) have 11 genital spines (Bartsch, 1975a).

DISTRIBUTION. Micronesia, Ponape Island, from intertidal coarse coral sand (Abé, 1996),

and Australia, Great Barrier Reef, from shallow water sandy deposits.

Rhombognathus Trouessart, 1888

TYPE SPECIES (by original designation). *Rhombognathus notops* (Gosse, 1855) = *Pachygnathus notops* Gosse, 1855.

DIAGNOSIS. Dorsal plates AD, OC and PD present, sometimes fused. AD with pair of setae. OC with 2 setae, 2 gland pores, and 0-2 corneae. PD with 1-2 pairs of setae. Adanal setae on anal plate. Ventral plates often fused. AE with 3 pairs of ventral setae plus 0-6 adjunct setae; PE with 1 dorsal, 3 ventral and 0-3 adjunct setae. Females with 1-45 pairs of pgs; males with 7-25 pairs of, generally plumose, pgs. Both pairs of maxillary setae on rostrum. Palps 4-segmented. P-2 with 1 dorsal seta in distal half; P-4 with 3 basal setae; apically an often spur-like seta. Legs shorter than idiosoma. Tibiae with 2 ventral setae, one or both bipectinate. Tarsi I-IV with 3, 3, 3-4, 3 dorsal setae, respectively, and 0 ventral setae. Solenidion on both tarsus I and II dorsolateral in position. Tarsi with 2 claws. Central sclerite between claws lacks tine-like process. Carpite (rod-like sclerite) present between end of tarsus and central sclerite.

Rhombognathus cyrtonotus sp. nov. (Figs 2, 3)

ETYMOLOGY. For the curved (kyrtos, Greek) back (notos, Greek), in contrast to the rather flattened idiosoma of the majority of *Rhombognathus*.

MATERIAL. HOLOTYPE. ♂ (MTQ), Great Barrier Reef, 19°20.12'S, 149°02.85'E, Elizabeth Reef, medium coarse sand at 10m, 24 December 1997; coll. J.C. Otto. PARATYPES. 2 ♀, 1 tritonymph (MTQ), collection data as above. 2 ♀ (QM S50962), collection data as above. 2 ♀ (ZMH A96/99), collection data as above. 4 ♀ (IB), collection data as above. OTHER MATERIAL. ♂ (WAM 99/1439), Great Barrier Reef, Lizard Island, Site 'Washing Machine', coarse sand and rubble at 7m depth, 14 October 1998; coll. J.C. Otto.

DESCRIPTION. *Male*. Idiosoma 202-211 long; holotype 211 long, 140 wide. Dorsum raised. AD, OC and PD separated (Fig. 2A). Plates uniformly covered with faint reticulum, each mesh subdivided. AD 57 long, 75 wide; anterior margin broadly arched, posterior margin rounded; gland pores in lateral margin; posterior line of internal muscle scars at 0.67. OC 65 long, 48 wide; with 2 corneae, 2 gland pores and a pore canaliculus; posterior gland pore by 2-3 times its diameter removed from lateral margin of OC.

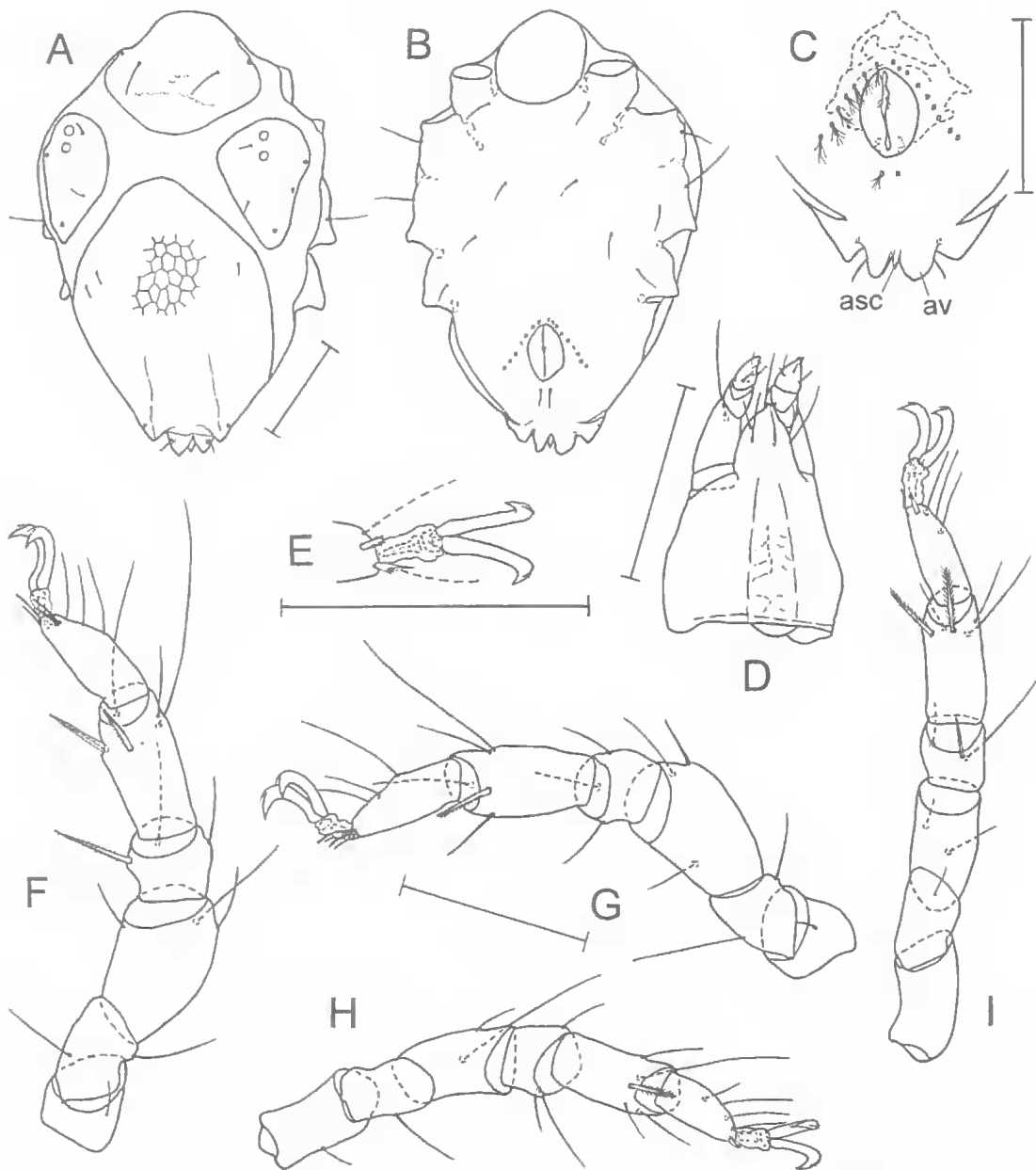


FIG. 2. *Rhombognathus cyrtonotus* sp. nov.; A, idiosoma, dorsal, male; B, idiosoma, ventral, male; C, posterior portion of idiosoma, ventral, male; D, gnathosoma, ventral, male; E, tip of tarsus IV, ventral (dorsal setae dashed), female; F, leg I, medial, female; G, leg II, medial, female; H, leg III, ventromedial, female; I, leg IV, ventral, female. asc = anal sclerite; av = anal valve. Scale bar = 50µm.

PD 127 long, 97 wide. Plate evenly and delicately reticulated; posteriorly with pair of narrow ridges but no wide costae. Posterior cones extending beyond median margin of PD. Pair of gland pores near posterior margin of PD. Anal sclerites small, squeezed between lamellar anal valves. Setae

ds-1 17 long; succeeding setae 7-8 long. Posterior seta on OC at 0.60. PD in holotype unilaterally with 2 setae, else with pair of single setae. Adanal setae on anal valves.

Ventral plates AE, PE, GP and AP fused to a ventral shield (Fig. 2B), this shield 169 long.

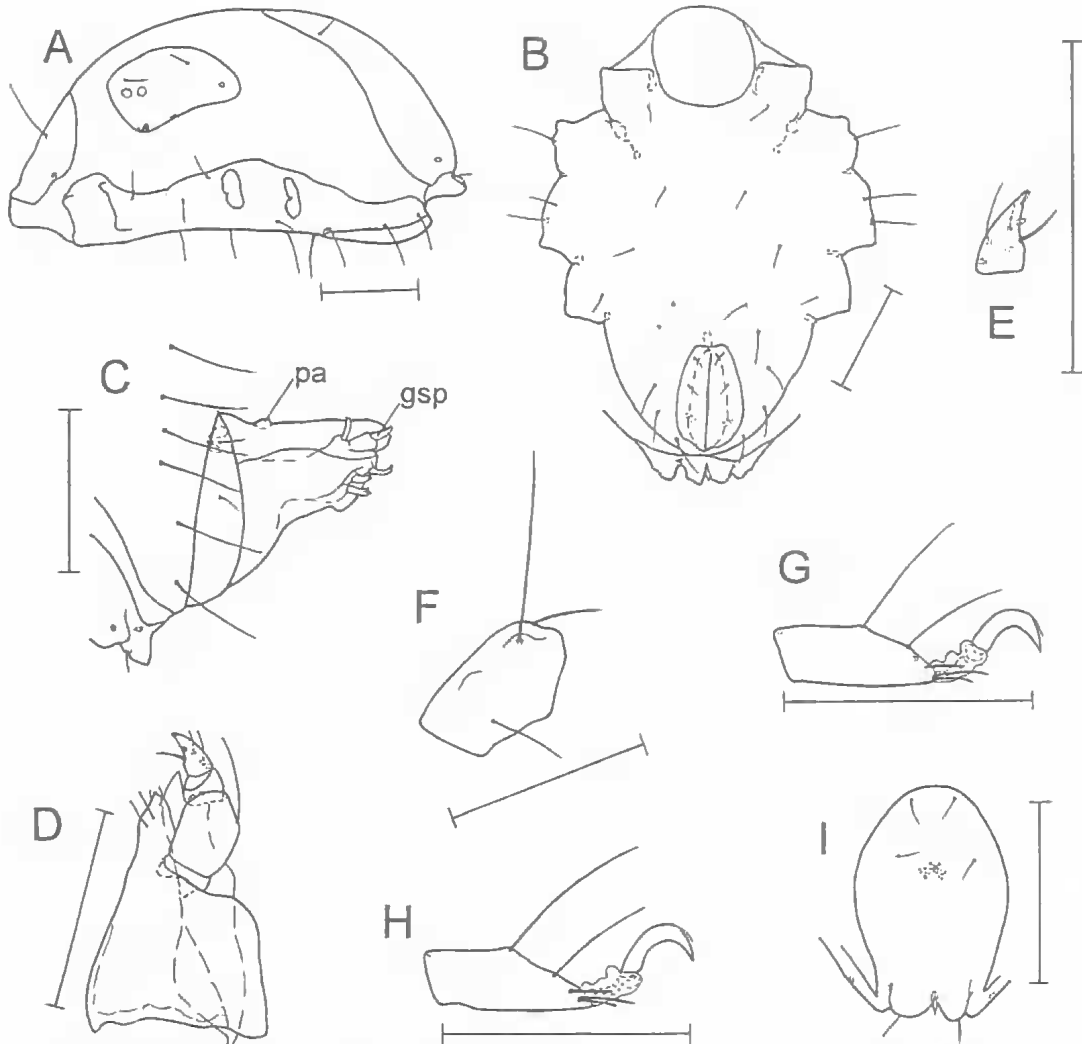


FIG. 3. *Rhombognathus cyrtonotus* sp. nov.: A, idiosoma, lateral, female; B, idiosoma, ventral, female; C, ovipositor, female (perigenital setae and genital spines of left side omitted); D, gnathosoma, lateral, female; E, fourth palpal segment, lateral; F, telofemur II, lateral, female; G, tarsus I, lateral, female (medial setae and claw omitted); H, tarsus II, lateral, female (medial setae and claw omitted); I, posterior portion of idiosoma, tritonymph. gsp = genital spines; pa = papilla. Scale bar = 50 μ m.

Areas corresponding to AE and PE lack adjunct setae. On PE ventral setae shorter than dorsal seta. GO 27 long, 17 wide; not reaching the level of insertion of leg IV. Perigenital setae plumose, arranged trapezoidally; holotype with 7 and 9 setae lateral to GO and 1 pair of basilar setae, close together, posterior to GO (Fig. 2C). Spermatopositor 42 long, 45 wide; extending beyond anterior perigenital setae.

Gnathosoma 56 long, 48 wide; 1.2 times longer than wide (Fig. 2D). Rostrum 19 long, anteriorly narrowed; 2 pairs of maxillary setae inserted

adjacent; rostral tip with one slender and 1 very reduced pair of rostral setae. Tectum slightly convex.

Legs I and IV equal in length; approximately 0.7 of idiosomal length. Insertion of leg III at 0.51, that of leg IV at 0.65. Legs as in female (Fig. 2F-I). Chaetotaxy of trochanter to tarsus: leg I, 1, 2, 3, 3, 5, 3; leg II, 1, 2, 3, 3, 5, 3; leg III, 1, 1, 2, 3, 5, 4; leg IV, 0, 1, 2, 3, 5, 3. Tarsus IV with 2 short, pectinate spiniform pas (Fig. 2E). Tarsus III with setiform medial pas and short, spiniform lateral pas.

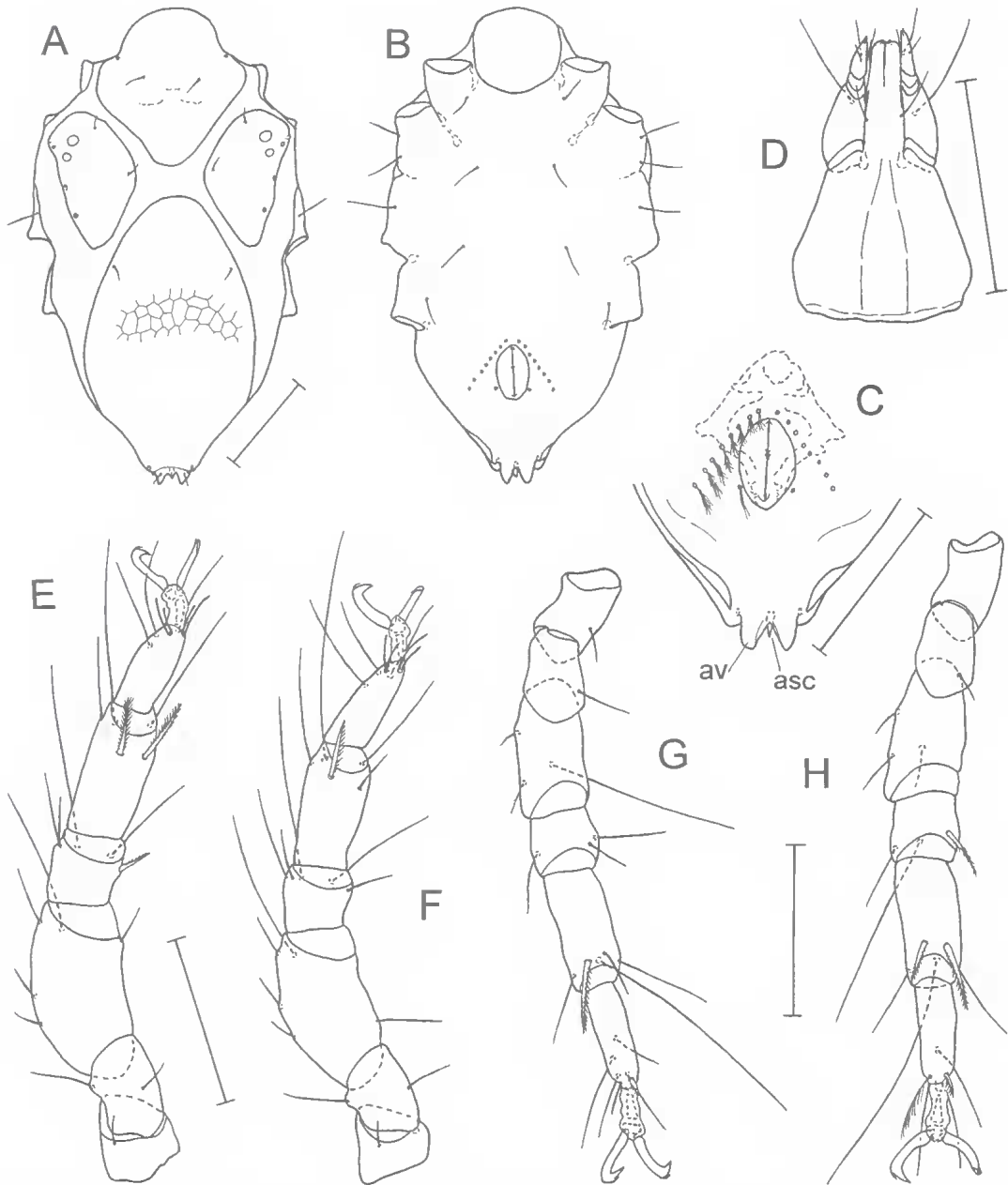


FIG. 4. *Rhombognathus delicatulus* sp. nov., male; A, idiosoma, dorsal; B, idiosoma, ventral; C, posterior portion of idiosoma, ventral; D, gnathosoma, ventral; E, leg I, ventromedial; F, leg II, ventromedial; G, leg III, ventral; H, leg IV, ventral. asc = anal sclerite; av = anal valve. Scale bar = 50 μ m.

Carpites of tarsi I and II 5 long, those of tarsi III and IV 6 long. Each claw with accessory process but no further tines.

Female. Idiosoma 223-247 long. Areas with striated integument wider than in males; dorsum distinctly raised (Fig. 3A). PD somewhat shorter

than in male. Ventral plates AE, PE and GP fused to a ventral shield; AP separated by wedge of striated integument (Fig. 3B). AE and PE lack adjunct setae. GO not reaching the level of insertion of leg IV. GO surrounded by 5 (rarely 6) pairs of pgs; anterior pairs of pgs positioned

somewhat anterior to the level of insertion of leg IV. Genital sclerites each with 2 sgs. Genital acetabula obscured. Extended ovipositor approximately 55 long; with pair of small, cone-like papillae basally and 5 pairs of sclerotised genital spines apically (Fig. 3C); each spine 6-7 long and ending with 5 tines.

Palps of gnathosoma extending beyond tip of rostrum (Fig. 3D). P-4 with one wide and 2 slender setae and a spur-like process (Fig. 3E). Chelieera 62 long; elaw with serrate dorsal edge.

Length:width ratio of telofemora: 1.7, 1.8, 1.6, 1.6. Tibiae I and II slightly shorter than telofemora I and II. Tarsi I and II slightly shorter than tibiae; tarsi III and IV as long as tibiae III and IV, respectively. Telofemora I and II (Fig. 3F) each with 2/1 dorsal/ventral setae, telofemora III and IV with 2/0 setae. Ventrolateral seta on genu I long, stout and bipectinate (Fig. 2F); these setae on genua II and III short, seta-like; ventrolateral seta on genu IV slightly pectinate and larger than seta on genu III. Tibiae I-IV with 2, 1, 1, 2 bipectinate setae. Tarsus I with papilliform famulus, setiform solenidion and pair of doubled pas (Fig. 3G); tarsus II (Fig. 3II) without famulus, else similar to tarsus I. Tarsi III and IV resembling those of male.

Tritonymph. Idiosoma 185 long. PD smaller but with pair of ridges and reticulation as in adults. AE and PE separated. GP and AP fused; this GA with 2 pairs of pgs and 1 pair of minute sgs (Fig. 3I). Number of setae of legs same as in adults; telofemora I-IV with 2/1, 2/1, 2/0, 2/0 setae.

Variations. Varieties in characters of adults: length of idiosoma, ♀: 223-247 (10); length of idiosoma, ♂: 202-211 (2); number of adjunct setae on either side of AE: 0 (19), 1 (1); number of adjunct setae, PE: 0 (19), 1 (1); number of pgs on either side of GO, ♀: 5 (16), 6 (4); number of pgs plus basilar setae in either half, ♂: 7+1 (3), 9+1 (1); number of setae of leg segments 2 to 5:

segment	leg I	leg II	leg III	leg IV
2	2(24)	2(24)	1(24)	1(24)
3	2/1(24)	2/1(24)	2/0(24)	2/0(24)
4	3(24)	3(24)	2(1), 3(23)	3(24)
5	5(24)	5(24)	5(24)	5(24)

REMARKS. *Rhombognathus cyrtonotus* is characterised by the combination of: idiosoma wide; PD with 1 pair of setae; AE, PE and GP fused in both males and females; AE and PE generally lack adjunct setae; female with 5 pairs of pgs; in males pair of basilar setae posterior to GO; gnathosoma 1.2 times longer than wide; telofemora I-IV with 2/1, 2/1, 2/0, 2/0 setae, and

tarsal claw with accessory process but without additional tines.

R. cyrtonotus resembles *R. cebuus* Bartsch, 1983, a species recorded from the Philippines (Bartsch, 1983). Females of *R. cyrtonotus* are distinguished from *R. cebuus* by the number of perigenital setae — 5 pairs in *R. cyrtonotus*, 11 pairs of setae in *R. cebuus*. Male *R. cyrtonotus* have the pair of basilar setae posterior to the GO; in *R. cebuus* these setae are level with the posterior edge of the GO.

At low magnification, *Rhombognathus cyrtonotus* is separated from eastern Australian congeners by the combination of: idiosoma wide; anal sclerites narrow; gnathosoma short; telofemora I and II each with 2/1 dorsal/ventral setae; claws with single tooth. In contrast to the majority of *Rhombognathus* species, the posterior gland pore on the OC of both adult and juvenile *R. cyrtonotus* is not close to the lateral margin but removed by 2-3 times the diameter of that pore. Males can be separated from congeners on the basis of the position of the basilar setae.

In contrast to the majority of *Rhombognathus* species, tritonymphs of *R. cyrtonotus* have the genital plate fused with the anal plate.

Rhombognathus delicatulus sp. nov. (Figs 4-6)

ETYMOLOGY. For the delicate (*delicatulus*, Latin) ornamentation of the dorsal plates.

MATERIAL. HOLOTYPE. ♂ (MTQ), Great Barrier Reef, 19°22.36'S, 149°01.05'E, Club 21 Reef, coarse sand and rubble at 15m, 26 December 1997; coll. J.C. Otto. **PARATYPES.** ♀, ♂, 1 tritonymph (MTQ), collection data same as above. ♀ and ♂ (QM S50963), collection data same as above. ♀ (WAM 99/1440), ♂ (WAM 99/1441), collection data same as above. ♀, ♂ (ZMH A97/99), collection data same as above. 3 ♀, 2 ♂, 2 tritonymphs (IB), collection data same as above. **OTHER MATERIAL.** ♀, ♂ (MTQ), Great Barrier Reef, 19°20.12'S, 149°02.85'E, Elizabeth Reef, coral rubble at 16-26m, 24 December 1997; coll. J.C. Otto. ♂ (IB), Great Barrier Reef, 19°20.12'S, 149°02.85'E, Elizabeth Reef, coarse sand and rubble at 10m, 25 December 1997; coll. J.C. Otto. 2 ♀, 2 ♂ (IB), Great Barrier Reef, 18°26.36'S, 146°42.24'E, Bramble Reef, coarse sand at 5m, 9 April 1998; coll. J.C. Otto.

DESCRIPTION. Male. Idiosoma 223-260 long; holotype 235 long, 137 wide. Dorsal plates delicately reticulated (Fig. 4A); each mesh subdivided. AD 78 long, 75 wide; anterior margin rounded; posterior portion of AD triangular; posterior sears of musele strings in an almost straight line at 0.60 relative to length of

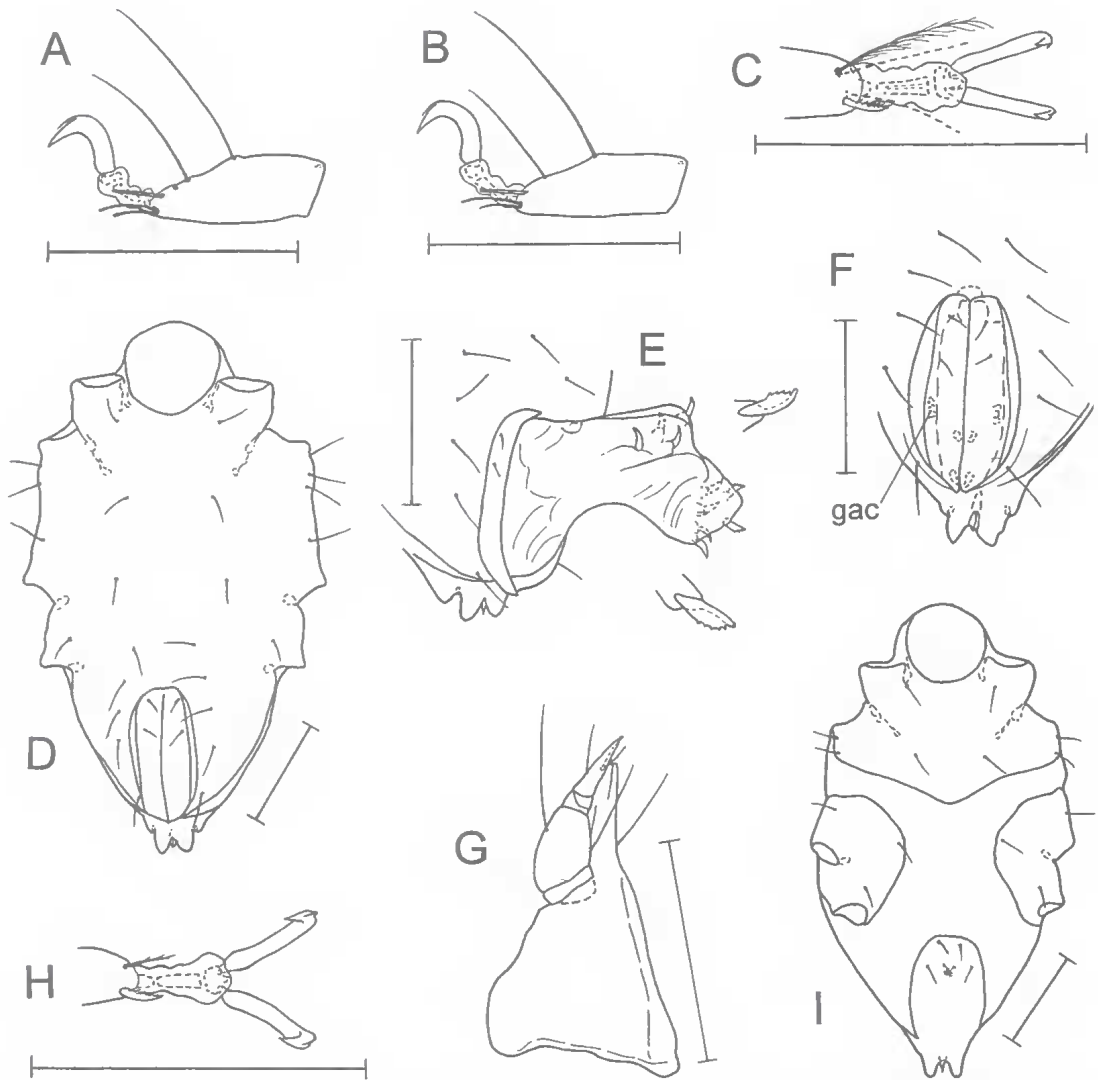


FIG. 5. *Rhombognathus delicatulus* sp. nov.; A, tarsus I, lateral, male (medial claw and setae omitted); B, tarsus II, lateral, male (medial claw and setae omitted); C, tip of tarsus IV, ventral, male (dorsal setae dashed); D, idiosoma, ventral, female; E, ovipositor and two of the genital spines (enlarged), female; F, posterior portion of idiosoma, ventral, female; G, gnathosoma, lateral, female; H, tip of tarsus IV, ventral, female (dorsal setae omitted); I, idiosoma, ventral, tritonymph. gac = genital acetabula. Scale bar = 50µm.

AD. Pair of gland pores in lateral margins at the level of insertion of leg I. OC 67 long, 37 wide; with 2 corneae and 2 gland pores in lateral margin; pore canaliculus almost halfway between gland pores. PD 137 long, 85 wide; evenly reticulated; each mesh with 12-18 minute pits. Anterior portion of PD rounded; posterior cones hardly extending beyond median margin of PD. Anal valves prolonged, extending beyond narrow anal sclerites. Dorsal idiosomatic setae small; ds-1 10 long and hardly longer than setae on OC

and PD. Posterior seta on OC at 0.44 relative to length of OC, that equals level of median edge. Single pair of setae on PD at 0.26. Adanal setae on anal valves.

AE, PE, GP, and AP fused to a ventral shield (Fig. 4B); this shield 195 long. Integument of ventral plates delicately punctate. Portion representing AE with 1 pair of adjunct setae. No adjunct setae on PE. GO 27 long, 17 wide. Anterior margin of GO almost level with insertion of leg IV; interval between posterior

edge of GO and end of idiosoma 1.4 times length of GO. Perigenital setae plumose; arranged trapezoidally; on either side a line of 8 setae; basilar setae adjacent to GO and at 0.80 relative to length of GO. Spermatopositor 40 long, 45 wide; extending beyond GO and anterior perigenital setae (Fig. 4C).

Gnathosoma 67 long, 42 wide; 1.6 times longer than wide (Fig. 4D). Rostrum slender, 30 long, 11 wide. Basal pair of maxillary setae almost 18 long; succeeding adjacent pair of setae distinctly shorter. Tectum truncate.

Leg I inserted at 0.11, leg IV at 0.64. Legs shorter than idiosoma. Leg I and IV subequal in length, about 0.8 times of length of idiosoma. Form of telofemora as in female. Tibiae cylindrical; each tibia slightly shorter than telofemur of that leg. Leg chaetotaxy, from trochanter to tarsus: leg I, 1, 2, 5, 5, 5, 3; leg II, 1, 2, 5, 5, 5, 3; leg III, 1, 1, 3, 3, 5, 4; leg IV, 0, 1, 3, 3, 5, 3. Telofemora I-IV with 4/1, 4/1, 3/0, 3/0 setae. Ventrolateral seta on both genu I and IV bipectinate (Fig. 4E, H); these setae on genua II and III slender (Fig. 4F, G). Tibia I with pair of stout, bipectinate setae; tibiae II and III each with slender, smooth ventrolateral and stout, bipectinate ventromedial seta. Tibia IV with large ventrolateral and shorter ventromedial seta; both bipectinate. Dorsal setae on tarsi at low magnification plain, under oil immersion delicate plumosity recognisable. Solenidion on tarsus I 10 long; famulus papilliform, 1 long, positioned halfway between solenidion and dorsal fossary seta (Fig. 5A). Solenidion on tarsus II 10 long (Fig. 5B). Tarsi I and II each with pair of doubled pas. Tarsus III with setiform, eupathid medial pas and spiniform, pectinate lateral pas. Medial pas on tarsus IV long and plumose; lateral pas spiniform and intensely pectinate (Fig. 5C).

Carpites on tarsi I and II 6 long, on tarsi III and IV 7-8 long. Accessory process of claws with single tooth.

Female. Idiosoma 192-269 long. Dorsal aspect same as in male. Setae ds-1 slightly longer than following setae. Ventral plates AE, PE and GP fused; this ventral shield contiguous with anal plate. GO surrounded by 10 perigenital setae. Anterior pair of pgs level with ventral setae on epimera IV. Second pair of pgs almost level with anterior edge of GO (Fig. 5D). Interval between pgs-4 and pgs-5 slightly larger than between the other pgs. Genital sclerites 63 long, each sclerite with 2 sgs. Ovipositor with 5 pairs of claw-like

genital spines; each genital spine with one large medial tooth and 4-5 lateral teeth (Fig. 5E). Genital acetabula very small, positioned immediately posterior to the level of pgs-4 (Fig. 5F).

Gnathosoma 1.5-1.6 times longer than wide. Palps straight; extending beyond end of rostrum (Fig. 5G). Basal pair of rostral setae almost as long as apical pair of maxillary setae. Chelicera 70 long. Cheliceral claw short.

Telofemora I-IV 1.9, 2.0, 2.0, 1.9 times longer than high. Medial pas on tarsus IV setiform, delicately plumose; lateral pas spiniform, pectinate (Fig. 5H).

Tritonymph. Idiosoma 182-212 long. PD smaller than in adults; median and lateral portions foveate, not reticulate. Ventral plates AE, PE and GA separate. AE with pair of adjunct setae. No adjunct setae on PE. GP and AP fused (Fig. 5I); GA with 2 pairs of pgs and 1 pair of sgs; 3 pairs of minute genital acetabula. Leg chaetotaxy from trochanter to tarsus: legs I and II, 1, 2, 4, 5, 5, 3; leg III, 1, 1, 3, 3, 5, 4; leg IV, 0, 1, 2-3, 3, 5, 3. Telofemora I to IV with 3/1, 3/1, 3/0 and 2-3/0 setae.

Variations. Amongst the material examined, several individuals, e.g. from Elizabeth Reef (MTQ), differ from those from the type locality in the following characters: gnathosomal base and rostrum short, gnathosoma 1.3-1.4 times longer than wide (Fig. 6A, B); reticulation of PD rather prominent; ds-1 about twice the length of the succeeding setae; ds-3 slightly posterior to medial corner of OC; bipectinate ventral seta on genu I as long as ventral setae of tibia I (Fig. 6C); ventral seta on genu IV slender, not pectinate (Fig. 6D); ventromedial seta on tibia IV slender, its pectination very faint or lacking; telofemora hardly longer than tibiae. Most marked is the short gnathosoma. Within the rhombognathines, such a difference in the length of the gnathosoma is unusual. Nonetheless, the specimens outlined are presently not regarded as belonging to a separate species.

Varieties of characters in adults: length of idiosoma, ♀: 192-269 (10); length of idiosoma, ♂: 223-260 (10); number of adjunct setae on either side of AE: 0 (2), 1 (33), 2 (5); number of adjunct setae on PE: 0 (40); number of pgs on either side of GO, ♀: 5 (20); number of pgs plus basilar setae

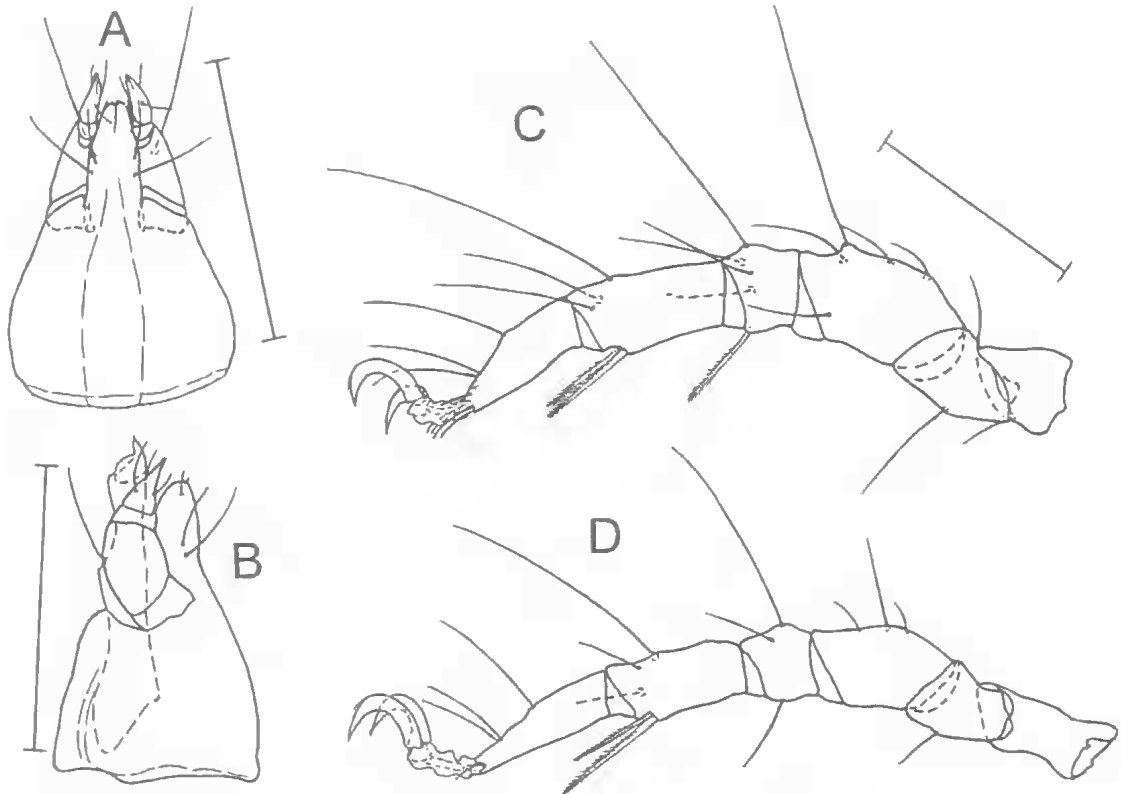


FIG. 6. *Rhombognathus delicatulus* sp. nov. from Elizabeth Reef: A, gnathosoma, ventral, male; B, gnathosoma, lateral, female; C, leg I, lateral, female; D, leg IV, medial, female. Scale bar = 50µm.

in either half, ♂: 7+1 (3), 8+1 (10), 9+1 (7); number of setae of leg segments 2 to 5:

segment	leg I	leg II	leg III	leg IV
2	2(40)	2(40)	1(40)	1(40)
3	3/1(1), 4/0(1), 4/1(38)	4/1(40)	3/0(39), 4/0(1)	3/0(40)
4	5(40)	5(40)	3(40)	3(40)
5	5(40)	5(40)	5(40)	5(40)

REMARKS. The most obvious characters of *Rhombognathus delicatulus* are: the uniformly reticulated PD with a single pair of setae; the ventral shield; the narrow anal sclerites surpassed by the anal valves, the low number of adjunct setae; the slender gnathosoma; the combination 4/1, 4/1, 3/0, 3/0 setae on the telofemora I-IV; and the claws with a single tine. At a superficial glance, *R. delicatulus* resembles the western Pacific *R. neptunellus* Bartsch, 1992, *R. oblongus* Bartsch, 1989a, *R. teurinus* Abé, 1996, and the western Australian *R. psammophilus* Bartsch, 1993.

R. neptunellus and *R. teurinus* differ from *R. delicatulus* in the outline of the AD, the insertion of ds-3 on the OC, and the shape of the

gnathosoma. The PD of *R. oblongus* is more slender than that of *R. delicatulus*. *R. psammophilus* lacks the reticulation on the dorsal plates, the series of muscle scars is closer to the posterior margin of the AD, and the ds-4 are closer to the anterior margin of the PD than in *R. delicatulus*.

***Rhombognathus lathridius* sp. nov.**
(Figs 7, 8)

ETYMOLOGY. Because of the shape of the body and legs, this species is believed to live hidden (*lathridios*, Greek) in sandy deposits.

MATERIAL. HOLOTYPE. ♂ (MTQ), Great Barrier Reef, 18°48.92'S, 146°25.76'E, Pandora Reef, St. 1, coarse sand, 1m, 22 January 1998: coll. J.C. Otto. PARATYPES. 2♂, 1 tritonymph (MTQ), collection data as above. ♀, ♂ (QM S50964), collection data as above. 2♀ (WAM 99/1442, 1443), collection data as above. ♀, ♂ (ZMH A98/99), collection data as above. 4♀, 3♂, 2 tritonymphs (IB), collection data as above.

DESCRIPTION. *Male*. Idiosoma 229-254 long, holotype 248 long, 145 wide. Dorsal plates very faintly and minutely reticulated. AD, OC and PD

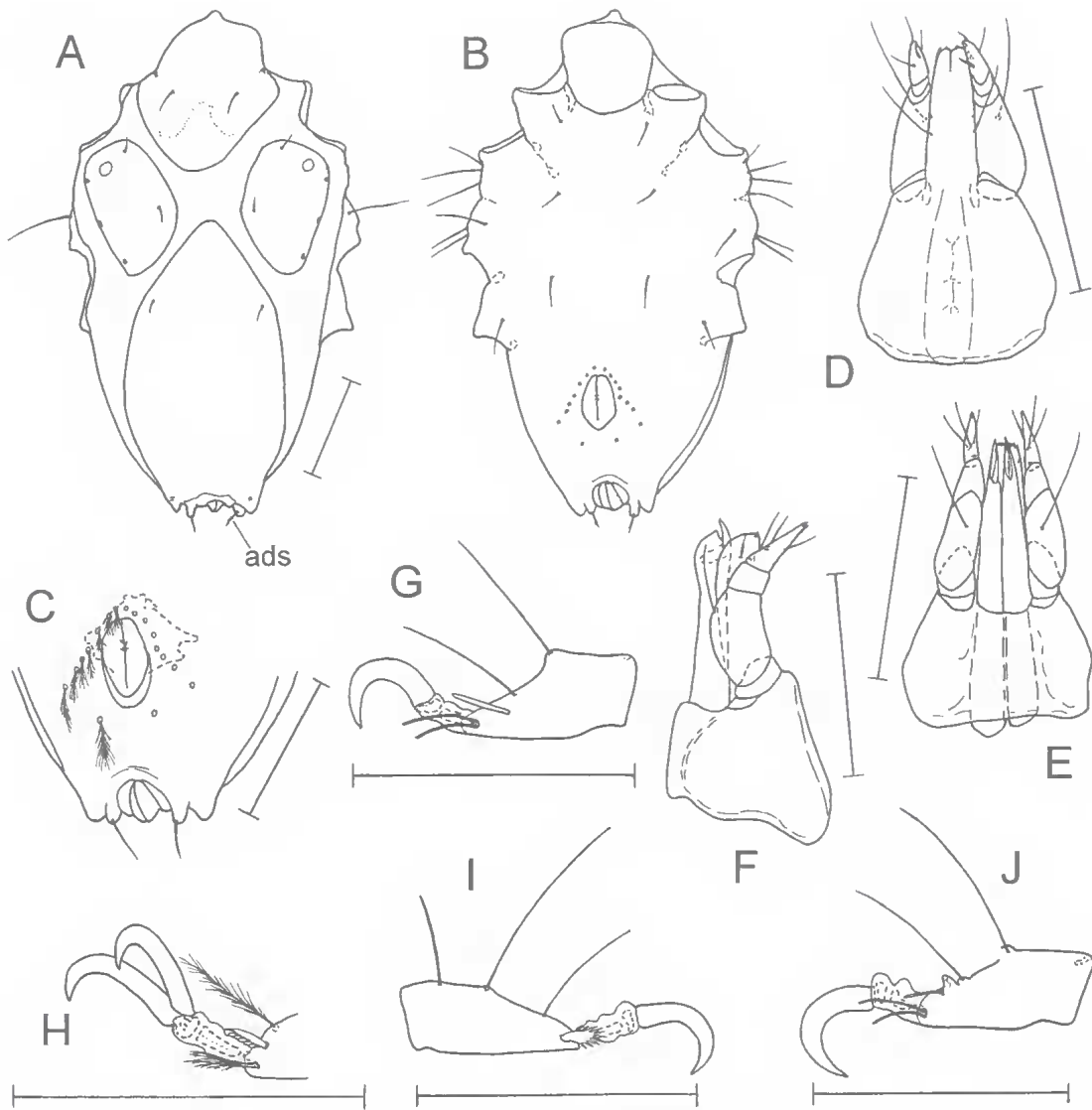


FIG. 7. *Rhombognathus lathridius* sp. nov.; A, idiosoma, dorsal, male; B, idiosoma, ventral, male (adanal setae illustrated both in A and B); C, posterior portion of idiosoma, ventral, male; D, gnathosoma, ventral, male; E, gnathosoma, dorsal, male; F, gnathosoma, lateral, male; G, tarsus II, lateral, male (medial claw and setae omitted); H, tip of tarsus IV, ventral, male (dorsomedial seta omitted); I, tarsus III, lateral, male (dorsomedial seta, medial pas and claw omitted); J, tarsus I, lateral, female (medial claw and setae omitted). ads = adanal seta. Scale bar = 50 μ m.

separated (Fig. 7A). AD 82 long, 72 wide; anterior margin with small, rounded process; posterior margin ovate. Pair of gland pores in lateral margins at the level of insertion of leg I. OC 67 long, 42 wide; each plate with single cornea; two gland pores in lateral margin; pore canaliculus between pores. PD 145 long, 80 wide. Anterior portion of PD triangular. Pair of gland pores at base of posterior cones. Dorsal

setae small; ds-1 approximately 10 long, not markedly longer than posterior pairs of setae. Setae ds-1 on AD posterior to the level of gland pores and at 0.52-0.54. Setae ds-3 at 0.52 relative to length of OC. Single pair of setae on PD at 0.27. Adanal setae 7 long, on tube-like pedestals.

Ventral plates AE, PE, GP, and AP fused to a ventral shield (Fig. 7B). Surface of plate delicately punctate. AE with 2-3 pairs of adjunct

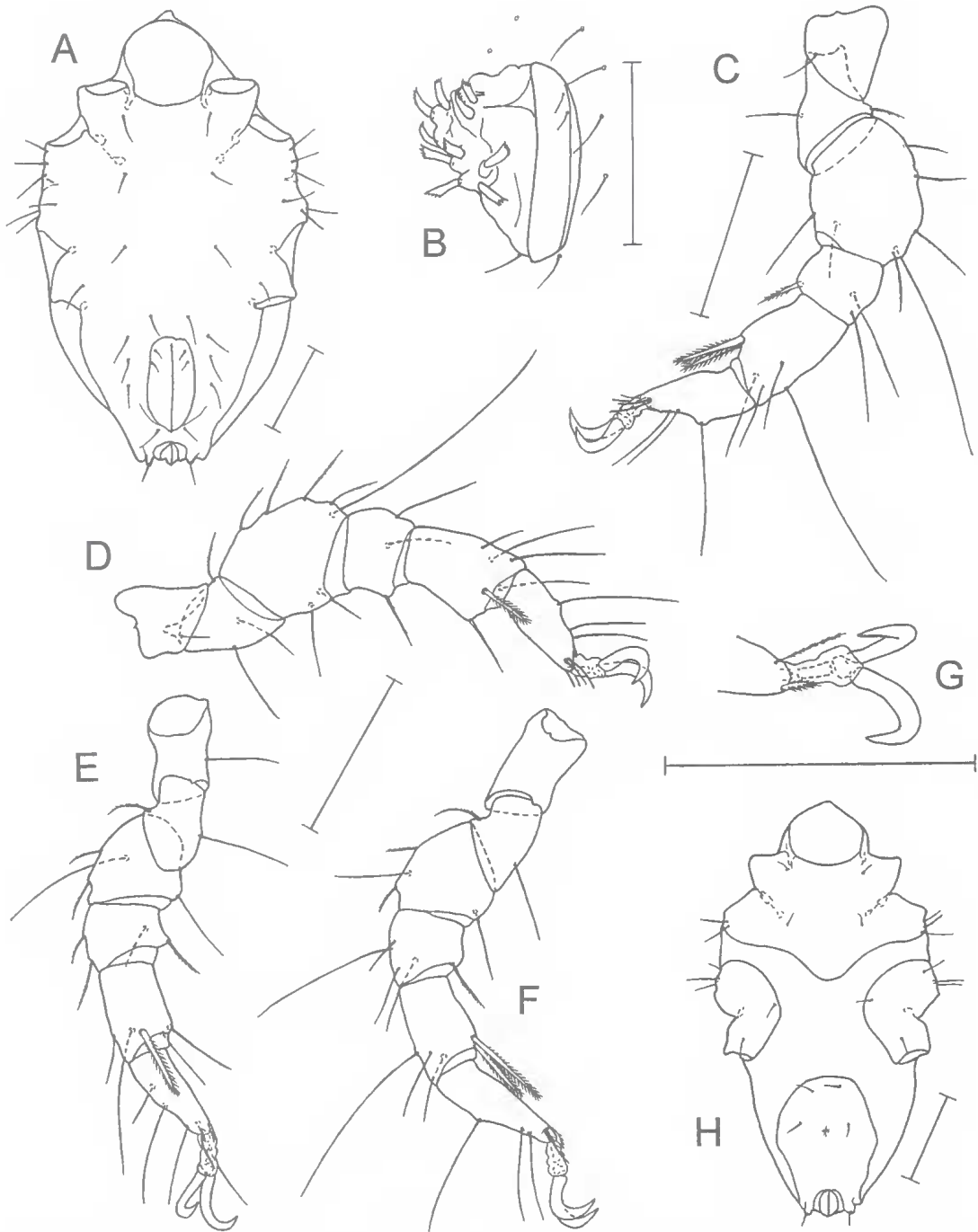


FIG. 8. *Rhombognathus lathridius* sp. nov.; A, idiosoma, ventral, female; B, ovipositor, ventrolateral, female; C, leg I, medial, female; D, leg II, medial, female; E, leg III, medial, female; F, leg IV, medial, female; G, tip of tarsus IV, ventral, female (dorsal setae omitted); H, idiosoma, ventral, tritonymph. Scale bar = 50µm.

setae. PE with 1 dorsal, 3 ventral and 2 marginal adjunct setae. GO 25 long, 15 wide. Perigenital

setae plumose; 7-8 setae arranged trapezoidally around GO; pair of basilar setae posterior to GO

(Fig. 7C). Spermatopositor 37 long, 40 wide, extending somewhat beyond anterior perigenital setae.

Gnathosoma slender, 75 long, 46 wide, 1.6 times longer than wide (Fig. 7D). Rostrum 32 long, 15 wide, almost parallel-sided. Tectum truncate (Fig. 7E). Basal pair of maxillary setae in basal half of rostrum. Palps slightly flattened, extending beyond tip of rostrum. P-2 with long dorsal seta. Chelicera 71 long. Cheliceral claw narrow (Fig. 7F), 10 long, its dorsal margin smooth.

Legs short, without claws and carpite about half as long as the idiosoma. Insertion of legs III and IV at 0.47 and 0.64, respectively. Number and arrangement of setae on trochanters to tibiae as in female. Tarsi I-IV with 3, 3, 4, 3 dorsal setae. Tarsi I and II each with pair of doubled pas; as in female, famulus on tarsus I 2 long (Fig. 7J), solenidion 6 long. Solenidion on tarsus II 10 long, conspicuously wide (Fig. 7G). Lateral pas on tarsus III flattened, bipectinate (Fig. 7I); medial pas setiform. On tarsus IV dorsolateral fossary seta plumose; lateral pas flattened, bipectinate; medial pas plumose (Fig. 7H).

Carpite short, on tarsi I and II 4 long; on tarsi III and IV 5 and 6 long. Claws short and smooth, they lack accessory processes and tines.

Female. Idiosoma 235-254. In dorsal aspect similar to male, though areas of striated integument larger. Pair of setae on PD at 0.25-0.28. Ventral plates AE, PE, GP, and AP fused to a ventral shield (Fig. 8A). GO surrounded by 10 perigenital setae. Anterior portion of GO not extending to the level of insertion of leg IV. Four anterior pairs of setae positioned almost equidistant. Anterior pairs of pgs 15 anterior to GO but not extending beyond the level of insertion of leg IV. Genital sclerites with 2 pairs of sgs. Ovipositor with 5 pairs of claw-like genital spines (Fig. 8B); spines 5 long, 3 wide; each with 5-6 tines.

Legs I and II flattened. Telfemora I-IV 1.3, 1.3, 1.2, and 1.3 times longer than high, respectively. Tibiae I-IV slightly shorter than telfemora. Leg chaetotaxy: leg I (Fig. 8C), 1, 2, 7, 3, 6, 3; leg II (Fig. 8D), 1, 3, 7, 3, 6, 3; leg III (Fig. 8E), 1, 2, 4, 4, 5, 4; leg IV (Fig. 8F), 0, 2, 4, 5, 5, 3. Basifemora, genua and tibiae dorsally with short slightly plumose setae which are less than length of each segment, and 0-1 long smooth setae which are much longer than length of the segment. Ventral seta on genua delicately pectinate. Tibiae I-IV with 2, 1, 1, 2 bipectinate setae. Ventral setae on tibia I equal in length; on

tibia IV ventrolateral seta slightly smaller than ventromedial one. Slender ventrolateral seta of tibiae II and III as long as coarsely bipectinate ventromedial seta. Dorsal setae on tarsus IV smooth; lateral pas short, flattened, pectinate; medial pas slender, lightly plumose (Fig. 8G).

Tritonymph. Idiosoma 232 long. Shape of AD and OC similar to that of adults. PD shorter; ds-4 inserted at 0.22. Plates AE, PE and GA separated (Fig. 8H). AE with 1-2 pairs of adjunct setae; PE with 1 pair of adjunct setae; GA with 2 pairs of pgs. Leg chaetotaxy, from trochanter to tarsus: leg I, 1, 2, 6, 3, 6, 3; leg II, 1, 3, 6, 3, 6, 3; leg III, 1, 2, 3, 3, 5, 4; leg IV, 0, 2, 2-3, 4, 5, 3. Arrangement of pectinate setae on tibiae same as in adults. Tarsi III and IV each with flattened bipectinate lateral pas, and slender, setiform medial pas.

Variations. Varieties of characters in adults: length of idiosoma, ♀: 235-254 (9); length of idiosoma, ♂: 229-254 (6); number of adjunct setae on either side of AE: 1 (9), 2 (21), 3 (2); number of adjunct setae, PE: 1 (10), 2 (22); number of pgs on either side of GO, ♀: 4 (1), 5 (18), 6 (1); number of pgs plus basilar setae in either half, ♂: 7+1 (11), 8+1 (1); number of setae of leg segments 2 to 5:

segment	leg I	leg II	leg III	leg IV
2	2 (28)	3(28)	2(27)	2(27)
3	5/2(28)	5/2(27), 6/2(1)	3/1(26), 4/0(1)	3/1(26), 4/1(1)
4	3(28)	3(27), 2(1)	4(26), 3(1)	5(27)
5	6(28)	6(28)	5(27)	5(27)

REMARKS. In the shape of the body, gnathosoma and legs, *Rhombognathus lathridius* is similar to *R. caudiculus* Bartsch, 1983, *R. conjunctus* Bartsch, 1986, *R. intermedius* Schulz, 1933, *R. latens* Bartsch, 1993 and *R. latibulus* Bartsch, 1993.

R. latens, a species known from Western Australia (Bartsch, 1993), can be separated from the others on the basis of the two pairs of setae on the PD and the enlarged number of perigenital setae around the female GO. *R. conjunctus*, an inhabitant of the Mediterranean (Bartsch, 1986), has the dorsal plates AD, OC and PD fused to a dorsal shield. *R. intermedius*, widely spread in sandy deposits in the shores of the Baltic, North Sea and northeastern Atlantic (Bartsch & Schmidt, 1979), has a short gnathosoma, slender telfemora and the adanal setae do not stand on small pedestals. *R. caudiculus* and *R. latibulus*, recorded from the Philippines and Western Australia (Bartsch, 1983, 1993), respectively, are most similar to *R. lathridius*, but the former species bears a single pair of adjunct setae on both

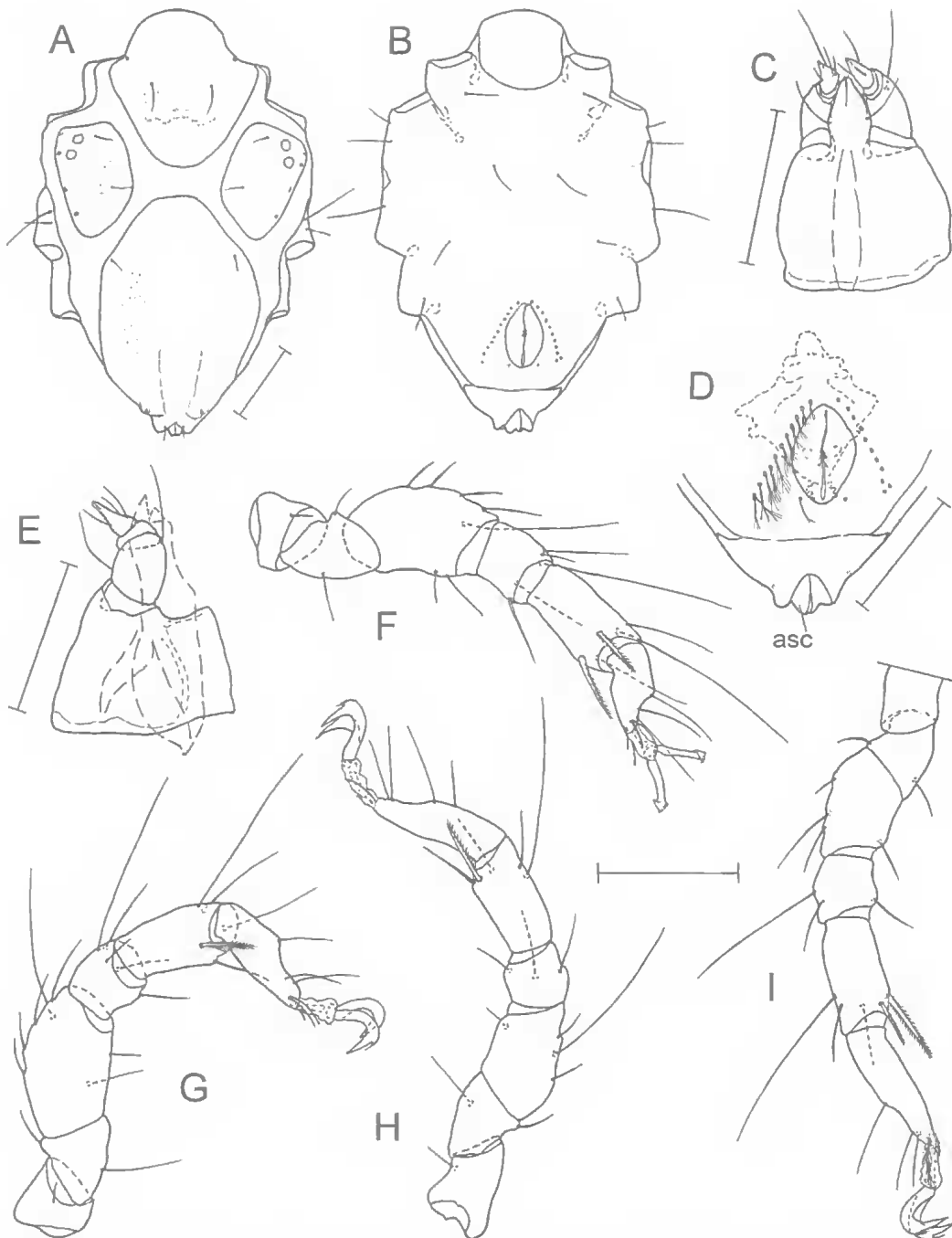


FIG. 9. *Rhombognathus levigatus* sp. nov., male; A, idiosoma, dorsal; B, idiosoma, ventral; C, gnathosoma, ventral; D, posterior portion of idiosoma, ventral; E, gnathosoma, lateral (chelicera dashed); F, leg I, ventromedial; G, leg II, medial; H, leg III, medial; I, leg IV, medial. asc = anal sclerite. Scale bar = 50 μ m.

AE and PE, and the anterior portion of the PD is broadly rounded, whereas *R. lathridius* has 3-4 pairs of adjunct setae on the AE, 2 pairs of adjunct

setae on the PE, and the anterior portion of the PD is triangular. Further distinguishing characters are: in the male of *R. caudiculus* the pair of basilar

setae is level with the posterior margin of the GO; and the telofemora I-IV of *R. latibulus* bear 4/2, 4/2, 2/1, 2/1 setae.

All specimens of *R. lathridius* have an elongate gnathosoma with a slender rostrum; there is no tendency of reduction of the gnathosomal length.

Tritonymphs of *R. lathridius* have the GP and AP fused, a character shared with *R. cyrtonotus* and *R. delicatulus*.

Rhombognathus levigatus sp. nov.
(Figs 9, 10)

ETYMOLOGY. From *levigare* (Latin), to smooth, for the almost smooth surface of the dorsal plates.

MATERIAL. HOLOTYPE. ♂ (MTQ), Great Barrier Reef, 18°48.92'S, 146°25.76'E, Pandora Reef, St. 1, coral rubble, 0.3m, 22 January 1998; coll. J.C. Otto. PARATYPES. 2♀, 1 tritonymph (MTQ), collection data as above. ♂ (QM S50965), collection data as above. ♀ (WAM 99/1444), collection data as above. ♀ (ZMH A99/99), collection data as above. ♀, ♂ (IB), collection data as above.

DESCRIPTION. *Male*. Idiosoma 267-276 long; holotype 267 long, 173 wide. Surface of plates almost smooth; integument of lateral portions of AD and PD and medial portions of OC pierced by minute pores (Fig. 9A). AD 98 long, 93 wide. Anterior margin arched; posterior margin broadly rounded. Posterior transverse line of muscle scars at 0.69. OC 75 long and 48 wide. Lateral margin with 2 gland pores and, halfway between, a pore canaliculus. PD 140 long, 110 wide; wider than AD, and its anterior margin in the median truncate. Very slightly raised pair of oblong areolae with minute pores; posterior portion of PD faintly reticulated in the median and laterally. Anal sclerites not surpassed by anal valves. Setae ds-1 approximately 12 long; inserted at 0.44. Setae ds-2 and ds-3 on OC; ds-3 at 0.57. Single pair of setae on PD at 0.28. Adanal setae on anal valves.

Ventral plates AE, PE and GP fused; GP and AP contiguous (Fig. 9B). Ventral shield from camerostome to tip of anal cone 219 long. AE and PE each with 1 pair of adjunct setae. GO 40 long, 23 wide. Perigenital setae plumose, arranged trapezoidally, with 11 setae in a line and 1 pair of basilar setae level with posterior edge of GO (Fig. 9D). Anterior edge of GO slightly surpassing the level of insertion of leg IV. Distance between posterior edge of GO and end of anal cone equalling length of GO. Genital sclerites with 2 pairs of sgs. Spermatopositor 60 long, 57 wide; extending beyond anterior pgs.

Gnathosoma short, 70 long, 58 wide, length:width ratio 1.2. Rostrum 25 long, 13 wide, triangular, shorter than gnathosomal base (Fig. 9C). Palps tightly appressed to rostrum. Chelicera 75 long (Fig. 9E). Cheliceral claw serrate.

Length of legs (claws included) 0.7 times that of idiosoma. Relative to length of idiosoma, insertion of legs III and IV at 0.55 and 0.72, respectively. Telofemora I-IV each about 1.7 times longer than high. Tibiae I and II somewhat shorter than telofemora (Fig. 9F, G); tibiae III and IV as long as telofemora (Fig. 9H, I). Tarsi I and II as long as these legs, tibiae; tarsi III and IV longer than tibiae III and IV, respectively. Leg chaetotaxy: leg I, 1, 2, 7, 5, 5, 3; leg II, 1, 2, 7, 5, 5, 3; leg III, 1, 2, 4, 3, 5, 4; leg IV, 0, 2, 4, 3-4, 5, 3. Telofemora I-IV with 5/2, 5/2, 3/1, 3/1 setae. On both genu I and II ventrolateral seta longer than ventromedial one; both setae almost plain. Tibiae I-IV with 2, 1, 1, 2 bipectinate spiniform setae. On tibia IV ventromedial spine shorter than ventrolateral one. Tarsus III with 4 dorsal setae; distance between 2 basal ones equalling half height of tarsus. Tarsus I with 1- long papilliform famulus and 8- long setiform solenidion (Fig. 10A). As in female, solenidion on tarsus II 10-11 long (Fig. 10D). Both tarsus I and II with pair of doubled pas. Medial pas on tarsus III setiform; lateral pas spiniform, delicately pectinate. Medial pas on tarsus IV long and plumose, lateral pas short and bipectinate (Fig. 10B).

Carpites on tarsi I and II 8-9 long; carpites on tarsi III and IV 10 long. Accessory process on claws widened, about 4-5 wide, bearing 5-6 small tines. No tines on claw shaft.

Female. Idiosoma 285-305 long. Outline of dorsal plates as in male though ornamentation lightly reticulate. Median portion of AD between ds-1 reticulate. Anterior margin of PD truncate; setae ds-4 at 0.21-0.24. AE, PE and GP fused; this ventral shield separated from anal plate by narrow lateral wedges of striated integument. GO extending anteriorly almost to level of insertion of leg IV. Area of genital plate with 5 pairs of pgs; two anterior pairs inserted distinctly anterior to GO (Fig. 10C). Genital sclerites with 2 pairs of sgs. Three pairs of tube-like genital acetabula. Genital spines claw-like. Tarsus III with spiniform lateral pas and 1-2 eupathid setiform medial pas (Fig. 10E). Lateral pas of tarsus IV similar to that of tarsus III; medial pas of tarsus IV slightly smaller than lateral pas.

Tritonymph. Idiosoma 248 long. Ventral plates separate; AE and PE each with a pair of adjunct

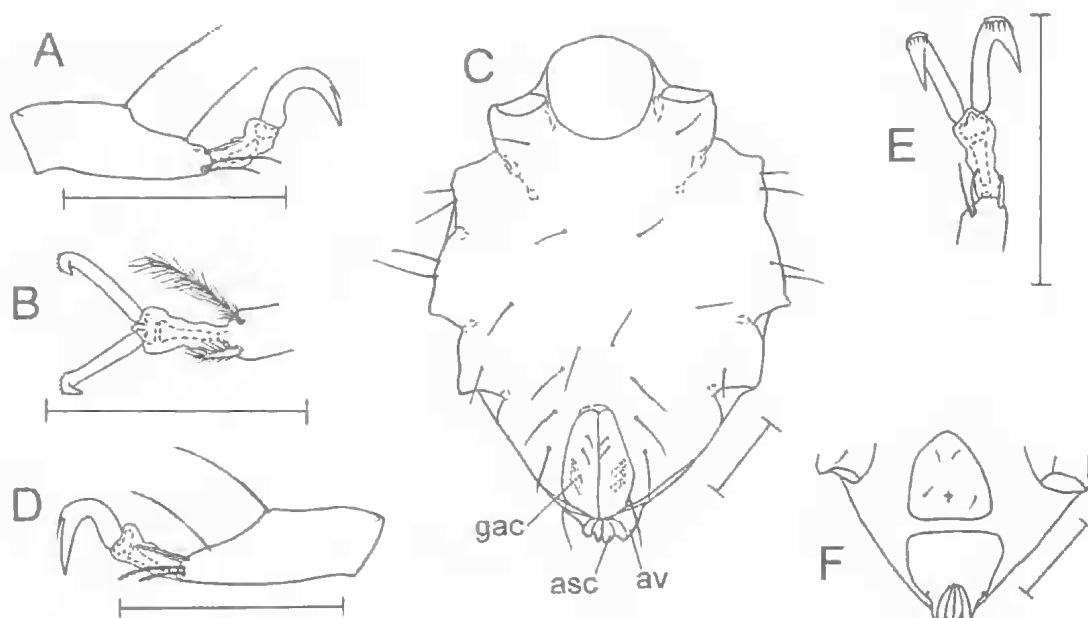


FIG. 10. *Rhombognathus levigatus* sp. nov., A, tarsus I, lateral, male (medial claw and setae omitted); B, tip of tarsus IV, ventral, male (dorsal setae omitted); C, idiosoma, ventral, female; D, tarsus II, lateral, female (medial claw and setae omitted); E, tip of tarsus III, ventral, female (dorsal setae omitted); F, posterior portion of idiosoma, ventral, tritonymph. asc = anal sclerite; av = anal valve; gac = genital acetabula. Scale bar = 50µm.

setae. GP and AP separate (Fig. 10F). GP with 2 pairs of pgs and 1 pair of sgs. Telo femora I-IV with 4/2, 4/2, 3/1, 2-3/1 dorsal/ventral setae. Setation of the other segments same as in adults.

Variations. Varieties of characters in adults: length of idiosoma, female: 285-305 (5); length of idiosoma, male: 267-276 (3); number of adjunct setae on either side of AE: 1 (12), 2 (4); number of adjunct setae, PE: 1 (15), 2 (1); number of pgs on either side of GO, female: 5 (10); number of pgs plus basilar setae in either half, male: 9+1 (2), 10+1 (2), 11+1 (2); number of setae of leg segments 2 to 5:

segment	leg I	leg II	leg III	leg IV
2	2(16)	2(16)	2(16)	2(16)
3	4/2(2), 5/2(14)	4/2(2), 5/1(1), 5/2(13)	3/1(14), 4/1(1), 5/1(1)	2/1(4), 3/1(12)
4	5(16)	5(16)	3(16)	3(15), 4(1)
5	5(16)	5(16)	5(16)	5(16)

Anomaly. In one of the females the left OC is lacking and replaced by striated integument.

REMARKS. *Rhombognathus levigatus* is characterised by: smooth PD with single pair of setae; AE, PE and GP fused; area of AE and PE each with 1 pair of adjunct setae; female with 5 pairs of pgs; male with 10-12 pairs of plumose pgs; short gnathosoma 1.2 times longer than wide;

telo femora I-IV with 5/2, 5/2, 3/1, 3/1 dorsal/ventral setae. Slightly widened accessory process with 5-6 tines.

In the samples from the Great Barrier Reef, three species, *Rhombognathus levigatus*, *R. reticulifer* sp. nov. and *R. tericulus* sp. nov., have claws with the slightly widened accessory process bearing a few tines. In contrast to *R. levigatus*, the dorsal plates of *R. reticulifer* and *R. tericulus* have a distinct reticulate ornamentation and long ds-1. The three species also differ in the number of dorsal/ventral setae on the telofemora I to IV.

Compared to *Rhombognathus* species from other parts of the world, *R. levigatus* is similar to *R. notopsoides* Bartsch, 1979, *R. semireticulatus* Bartsch, 1977, *R. smensis* Bartsch, 1990, and *R. ventralis* Newell, 1984. *R. notopsoides* is a brackish water species from eastern North America (Bartsch, 1979b), *R. sinensis* is recorded from southern China and Japan (Bartsch, 1990; Abé 1996), and *R. semireticulatus* and *R. ventralis* from the Eastern Pacific (Bartsch, 1977; Newell, 1984). The dorsal plates of *R. notopsoides* are distinctly ornamented. In *R. semireticulatus*, too, each of the dorsal plates bears a distinct ornamentation, and, in contrast to *R. levigatus*, each of the telofemora I and II has 5 dorsal setae but only 1 ventral seta. In *R. sinensis*,

the arrangement of the setae on the telofemora I to IV is the same as in *R. levigatus* but the outline and the ornamentation of the PD is different, and the number of tines on the accessory processes is somewhat larger than in the latter species. The telofemora I to IV of *R. ventralis* bear 6, 6, 4, 4 setae, the ds-1 are rather long, whereas in *R. levigatus* the ds-1 are short and the telofemora bear 7, 7, 4, 4 setae.

***Rhombognathus longipes* sp. nov.**
(Figs 11-13)

ETYMOLOGY. From (Latin) *longus*, long, and *pes*, foot, leg, for the long legs.

MATERIAL. HOLOTYPE. ♂ (MTQ), Great Barrier Reef, 18°25.93'S, 147°21.11'E, Faraday Reef, coarse sand and rubble, 10m, 13 April 1998; J.C. Otto. PARATYPES. 3♀, 2♂, 1 protonymph (MTQ), collection data as above. ♀, ♂ (QM S50966), collection data as above. 2♀ (WAM 99/1445, 1446), collection data as above. One ♀, ♂ (ZMH A100/99), collection data as above. 6♀, 2♂, 1 tritonymph, 2 deutonymphs (IB), collection data as above. OTHER MATERIAL. ♂ (MTQ), Great Barrier Reef, 18°25.93'S, 147°21.11'E, Faraday Reef, coarse sand and rubble, 2m, 13 April 1998; J.C. Otto.

DESCRIPTION. *Male*. Idiosoma slender, 317-328 long; holotype 335 long, 185 wide. Dorsal plates with delicate reticulation. AD 112 long, 100 wide; anterior margin broadly rounded; posterior margin ovate. Line of internal scars at about 0.75 (Fig. 11A). OC 100 long, 55 wide; anterior cornea slightly larger than posterior one. Distance between gland pores 50; pore canaliculus almost halfway between gland pores. PD 167 long, 97 wide, 1.7 times longer than wide. Pair of posterior cones of PD almost extending to end of anal cone; each cone with gland pore. Setae ds-1 10-15 long, positioned in posterior half of AD at 0.64, i.e. somewhat anterior to transverse line of scars. Second pair of setae on OC almost at 0.43. PD with single pair of setae at 0.16. Adanal setae distally on anal plate. Anal sclerites well developed.

AE, PE, GP, and AP fused (Fig. 11B). Area of AE with pair of adjunct setae, that of PE with 0 and 1 adjunct seta. GO 35 long, 25 wide; anterior margin level with insertion of leg IV. With 9 and 10 pgs on either side of GO; pair of basilar setae incorporated in line of pgs (Fig. 11C). Spermopositor 52 long, 46 wide, slightly extending beyond GO.

Gnathosoma 90 long, 67 wide, 1.3 times longer than wide. Rostrum slender, apically pointed (Fig. 11D); almost as long as gnathosomal base. Narrow tectum truncate. Basal pair of maxillary

setae in middle of rostrum; apical pair almost as long as basal pair. Slender palps appressed to rostrum.

Legs slender; the four pairs similar in length and approximately 0.9 of length of idiosoma. Legs III and IV at 0.53 and 0.69, respectively. Telofemora I-IV 2.7, 2.9, 2.7, 2.5 times longer than high. Leg chaetotaxy: leg I, 1, 2, 5, 5, 5, 3; leg II, 1, 2, 5, 5, 5, 3; leg III, 1, 1, 3, 3, 5, 4; leg IV, 0, 1, 3, 3, 5, 3. Telofemora I-IV with 4/1, 4/1, 3/0, 3/0 setae. Two basidorsal setae on telofemora I and II short, spiniform (Figs 11E, F). Bipectinate setae on tibiae I-IV numbering 2, 1, 1, 2; these setae on tibiae I, II and III conspicuously long; on tibia IV ventrolateral bipectinate seta distinctly longer than ventromedial one. Tarsi slender. Basal setae of tarsi III and IV inserted in apical half of these segments (Figs 12A, B). Two basal setae on tarsus III adjacent. Tarsus I slender, with elongate papilliform famulus and solenidion 14- long. Tarsi I and II with doubled pas; on tarsus III medial pas setiform, lateral pas short, spiniform (Fig. 12D); on tarsus IV medial pas long, plumose; lateral pas flattened, pectinate (Fig. 12E).

Carpites on tarsi I and II 10 long, those on tarsi III and IV 11-12 long. Claws short: rounded apex with small accessory process.

Female. Idiosoma 335-365 long. Dorsal aspect similar to that of male. AE, PE and GP fused. AE with 1, rarely 2 adjunct setae on either side; PE with 1, rarely 0, adjunct seta. GO 85 long; genital sclerites each with 2 sgs. With 5 pairs of pgs (Fig. 12F). Two anterior pairs of pgs anterior to level of anterior edge of GO; anteriormost pair of setae slightly anterior to level of insertion of leg IV; its distance to edge of GO equalling 0.3 times length of GO. Posterior pair of pgs distinctly removed from the other setae. Ovipositor in rest reaching beyond GO (Fig. 12F). Extended ovipositor long; with basal pair of conical papillae and 5 pairs of apical genital spines (Fig. 12G). Genital spines 8-9 long, each with 4 lateral tines. Gnathosoma with slender palps (Fig. 12H). P-4 with setae in basal whorl as illustrated (Fig. 12I); tip with 2 spurs and 1 setula. On tarsus IV medial pas shorter and less plumose than in male; lateral pas flattened and pectinate (Fig. 12J).

Tritonymph. Idiosoma 340 long, 185 wide. Posterior margin of AD truncate (Fig. 13A). OC short, only slightly extending beyond posterior gland pore; ds-2 within or just anterior to margin. PD much shorter than in adults. Ventral plates AE, PE, GP, and AP separated. Posterior portion of AE with projecting triangular or obtuse

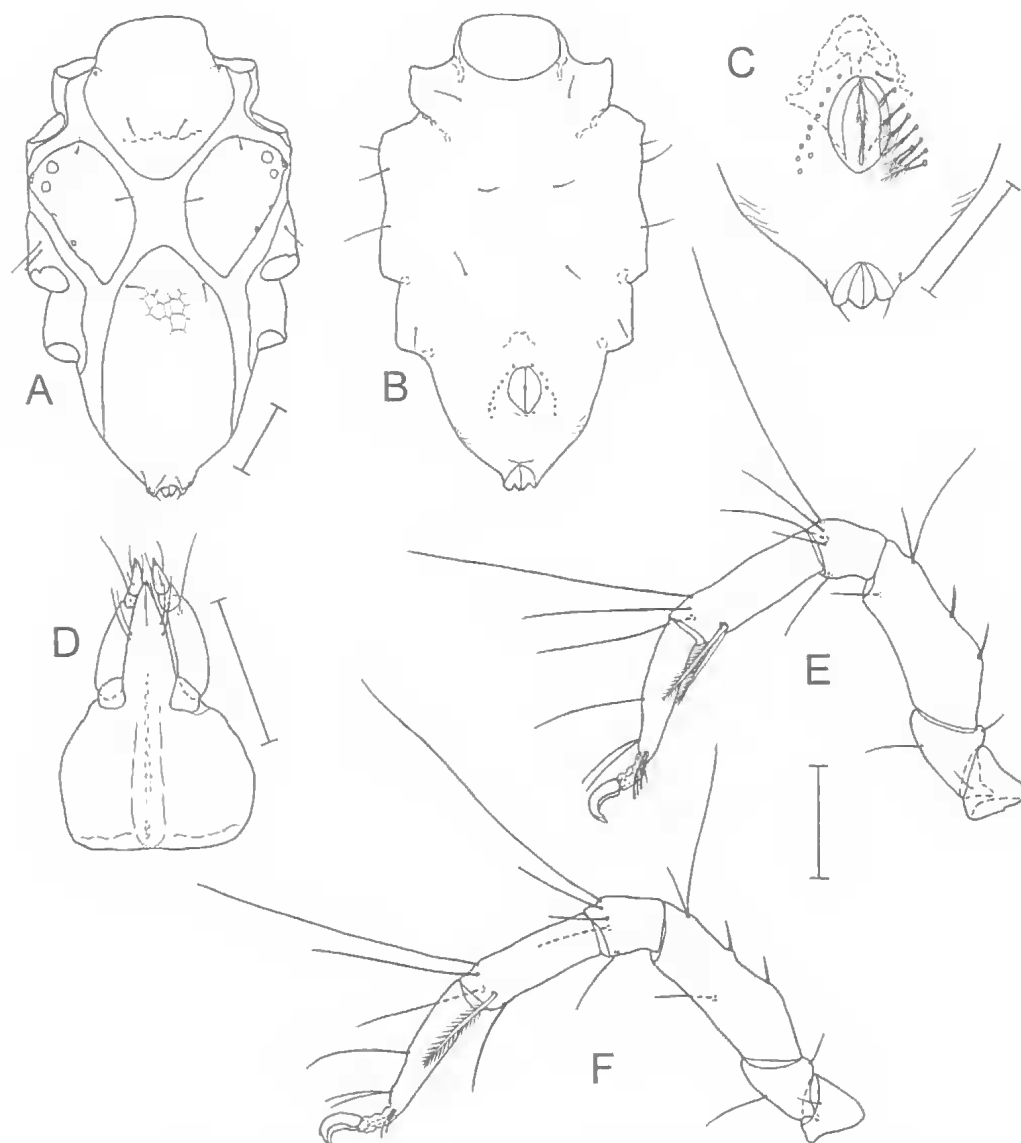


FIG. 11. *Rhombognathus longipes* sp. nov., male; A, idiosoma, dorsal; B, idiosoma, ventral; C, posterior portion of idiosoma, ventral; D, gnathosoma, ventral; E, leg I, medial; F, leg II, medial. Scale bar = 50 μ m.

portion, similar as figured in protonymph (Fig. 13E). AE and PE each with 1 pair of adjunct setae. GP with 2 pairs of pgs and 1 pair of sgs; 3 minute pairs of internal genital acetabula (Fig. 13B). Telfemora I-IV with 4/1, 4/1, 2/0, 2/0 setae. Setation of the other leg segments same as in adults.

Deutonymph. Idiosoma 236-263 long. In dorsal aspect similar to tritonymph. GP and AP fused (Fig. 13C); plate with 2 pairs of minute internal genital acetabula.

Protonymph. Idiosoma 178 long, 105 wide. AD posteriorly truncate; PD short, ovate (Fig. 13D). AE with 3 pairs of setae (Fig. 13E); PE with 1 dorsal and 1 ventral seta. Genua I-IV with 4, 4, 3, 3 setae; telfemora I-III with 2/1, 2/1, 2/0 setae, femur IV with 2/0 setae.

Variations. Varieties of characters in adults: length of idiosoma, ♀: 335-365 (10); length of idiosoma, ♂: 317-328 (8); number of adjunct setae on either side of AE: 1 (28), 2 (11); 3 (1); number of adjunct setae, PE: 0 (5), 1 (35);

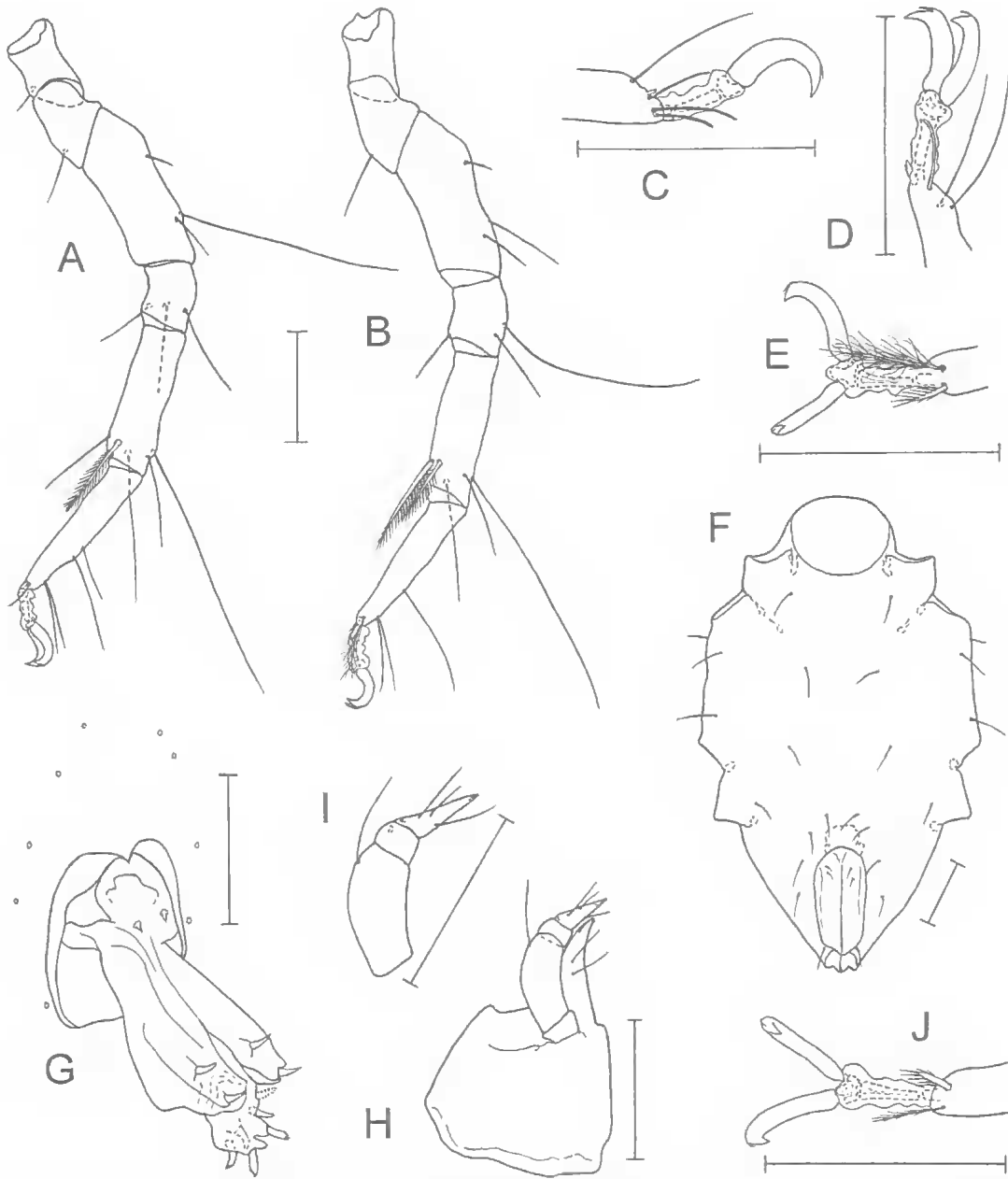


FIG. 12. *Rhombognathus longipes* sp. nov.; A, leg III, medial, male; B, leg IV, medial, male; C, tip of tarsus I, lateral, male (medial claw and setae omitted); D, tip of tarsus III, lateral, male; E, tip of tarsus IV, ventral, male (dorsal setae omitted); F, idiosoma, ventral, female; G, ovipositor, ventrolateral, female (spine in dotted line broken); H, gnathosoma, lateral, female; I, P-2 to P-4, lateral, female; J, tip of tarsus IV, ventral, female (dorsal setae omitted). Scale bar = 50µm.

number of pgs on either side, ♀: 5 (20); number of pgs on either side, ♂: 8 (8), 9 (7), 10 (1); number of setae of leg segments 2 to 5:

segment	leg I	leg II	leg III	leg IV
2	2(40)	2(40)	1(40)	1(40)
3	4/1(40)	2/1(1), 4/1(36), 5/1(3)	2/0(2), 3/0(38)	2/0(1), 3/0(39)
4	5(40)	5(40)	3(40)	3(40)
5	5(40)	5(40)	5(40)	5(40)

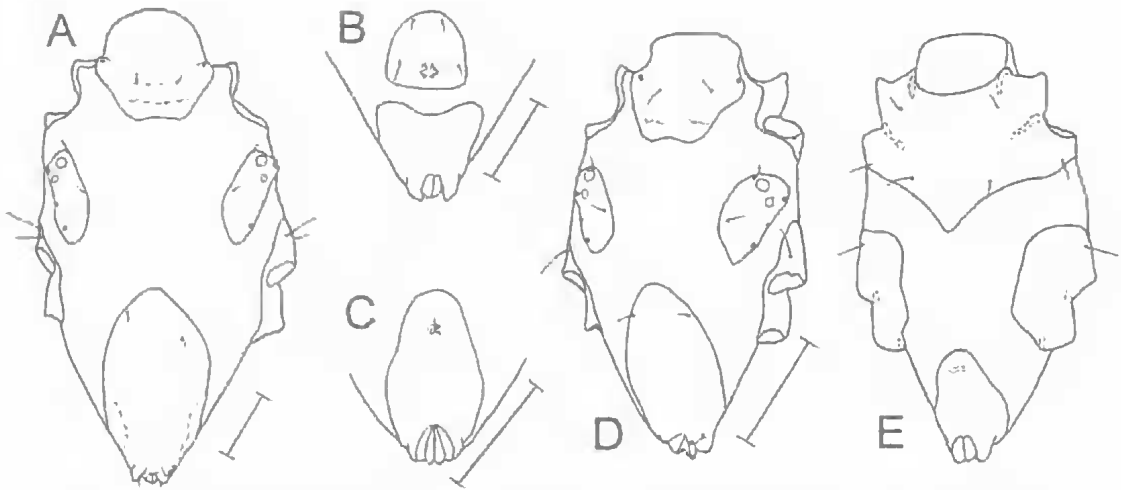


FIG. 13. *Rhombognathus longipes* sp. nov.; A, idiosoma, dorsal, tritonymph; B, posterior portion of idiosoma, ventral, tritonymph; C, posterior portion of idiosoma, ventral, deutonymph; D, idiosoma, dorsal, protonymph; E, idiosoma, ventral, protonymph. Scale bar = 50 μ m.

REMARKS. *Rhombognathus longipes* can be separated from congeneric Australian species on the basis of the slender idiosoma with long, slender legs, leg I being almost as long as the idiosoma. *R. longipes* is most similar to *R. longisetus* Bartsch, 1999, a species known from New Caledonia. The most marked difference is the length of the ds-1 — in *R. longipes* short, less than 1/4 of the length of the AD, in *R. longisetus* as long as the AD. Apart from few exceptions, e.g. the ds-5 in the Mediterranean *Copidognathus gibbus* (Trouessart, 1889) and *C. majusculus* (Trouessart, 1894), the length of a seta is generally a stable character within a species. Further distinguishing characters are: The position of the ds-1 (in *R. longipes* inserted at 0.64, in *R. longisetus* at 0.57), the length of the ovipositor (in *R. longipes* distinctly extending beyond the GO, in *R. longisetus* only slightly surpassing the GO), the arrangement of the pgs around the female GO (in *R. longipes* almost equidistant whereas in *R. longipes* the posterior pair of the setae is distanced from the preceding pair). The male GA of *R. longisetus* has a post-genital papilla which is lacking in *R. longipes*.

***Rhombognathus papuensis* Bartsch, 1989**
(Figs 14, 15)

Rhombognathus papuensis Bartsch, 1989a: 236, figs 50-55
not *Rhombognathus papuensis* - Chatterjee, 1995, 282-284,
figs 1-14.

MATERIAL. ♀, ♂ (MTQ), Great Barrier Reef, Magnetic Island, Alma Bay, rocky littoral, algae at 0.5m, 16 March 1998; coll. J.C. Otto. ♀, ♂ (QM S50967), collection data

as above. ♀, ♂ (MTQ), Great Barrier Reef, 18°41.29'S, 147°05.83'E, Loadstone Reef, *Halimeda* at 3-6m, 11 April 1998; coll. J.C. Otto. ♀, ♂ (QM S50968), collection data as before. 4♀, 1 tritonymph (IB), collection data as before. ♂, 1 tritonymph (IB), Great Barrier Reef, 19°20.12'S, 149°02.85'E, Elizabeth Reef, *Halimeda* sp. (Chlorophyta) at 10m, 25 December 1997; coll. J.C. Otto.

DESCRIPTION (based on specimens from shallow water habitats from Magnetic Island). Idiosomal length of female 310, of male 277-285. Dorsal plates with foveate sculpturing. Posterior AD broadly rounded; foveate areolae distinct in area anterior to short ds-1. OC large, with 2 comeae and 2 short setae; 2 gland pores and one pore canaliculus in lateral margin. PD with pair of wide costae; foveate areolae lateral and medial to costae (Fig. 14A). PD with single pair of setae, in females inserted at 0.24, in males at 0.31. Ventral plates AE, PE and GA fused. On either side of AE and PE (0-)1 adjunct setae. Female with pair of lateral wedges between GP and AP; 5 pairs of pgs inserted almost equidistant (Fig. 15F). Male with 9-13 plumose pgs arranged in a line on either side of GO, and pair of basilar setae adjacent to posterior part of GO (Fig. 14B). Spermatopositor 75 long, 66 wide, extending far beyond GO (Fig. 14C).

Gnathosoma short; length:width ratio 1.1 (Fig. 15A). Rostrum conical, short, hardly more than 1/3 of length of gnathosoma. Basal pair of maxillary setae longer than apical pair. Palps short.

Legs I and II slightly shorter than legs III and IV. Telofemora I to IV approximately 2.4 times longer than high. Telofemora I and II longer than

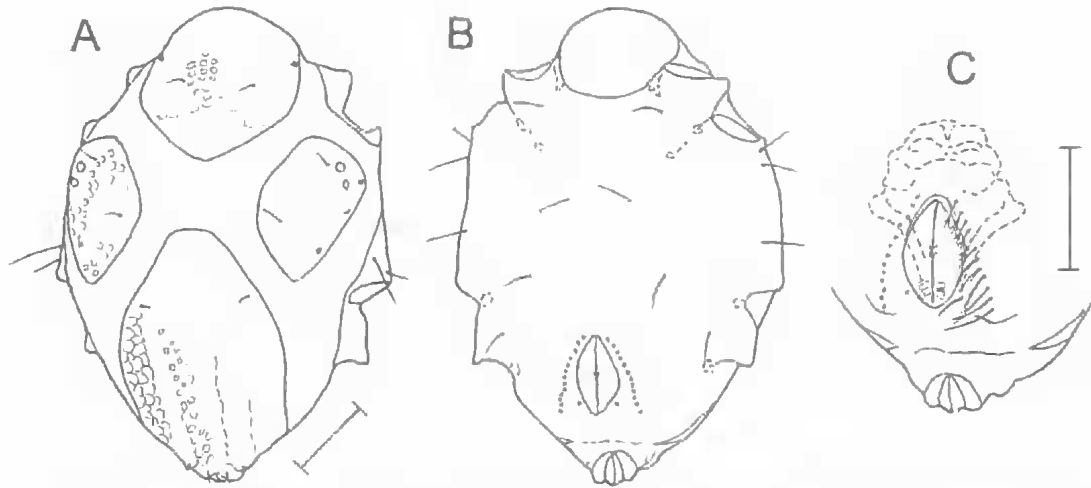


FIG. 14. *Rhombognathus pupuensis* Bartsch, male; A, idiosoma, dorsal; B, idiosoma, ventral; C, posterior portion of idiosoma, ventral. Scale bar = 50 μ m.

telifemora III and IV (Figs 15B-E). Tibiae I-IV almost equal in length. Tarsi I and II about as long as these legs' tibiae; tarsi III and IV distinctly longer than tibiae. Leg chaetotaxy (rare variants in parentheses): leg I, 1, 2, (4-)6, (4-)5, 5, 3; leg II, 1, 2, (5-)6, 5, 5, 3; leg III, 1, 2, 3, 3, 5, 4; leg IV, 0, 2, 3(-4), 3, 5, 3. Telifemora I-IV with (3/1, 3/2) 4/2, (3/2) 4/2, 3/0, 3/0 dorsal/ventral setae. Ventral seta on genu I slender. Tibiae I-IV with 2, 1, 1, 2 bipectinate setae. Two basal setae on tarsus III inserted adjacent. Two distal fossary setae on all tarsi equal in size and barbate. Tarsus I with papilliform famulus and slender, setiform solenidion (Fig. 15G).

Claws widened; truncate edge of this portion 17 wide and provided with 18-20 tines. Apical end of claw separated from truncate and widened portion (Fig. 15H).

Variations. Varieties of characters in adults: length of idiosoma, ♀: 310 (2); length of idiosoma, ♂: 277-285 (2); number of adjunct setae on either side of AE: 0 (1), 1 (7); number of adjunct setae, PE: 0 (1), 1 (6); number of pgs on either side of GO, ♀: 5 (4); number of pgs plus basilar setae in either half, ♂: 9+1 (1), 12+1 (2), 13+1 (1); number of setae of leg segments 2 to 5:

segment	leg I	leg II	leg III	leg IV
2	2(8)	2(8)	2(8)	2(8)
3	3/1(2), 3/2(1), 4/2(4)	3/2(3), 4/2(4)	3/0(8)	3/0(8)
4	4(1), 5(7)	5(8)	3(8)	3(8)
5	5(8)	5(8)	5(8)	5(8)

REMARKS. The specimens from the Elizabeth Reef and Loadstone Reef, from 10m and 3-6m

depth, respectively, differ slightly from the above outlined characters. Females are 204-275 long and males 223-241 long. The dorsal plates are more distinctly reticulated. The PD is slightly more slender; its costae are distinctly separated from the reticulate remainder. The number of pgs on the male GP is slightly smaller. The widened truncate edge of the claws are 12 wide.

Variation in the number of setae in specimens from the Elizabeth Reef and Loadstone Reef is as follows: number of adjunct setae on either side of AE: 1 (17); number of adjunct setae on PE: 1 (17), 0 (1); number of pgs on either side of GO, female: 5 (6); number of pgs on either side plus basilar setae, male: 9+1 (5), 10+1 (1); number of setae of leg segments 2 to 5:

segment	leg I	leg II	leg III	leg IV
2	2(17)	2(18)	2(18)	1(2), 2(16)
3	3/2(1), 4/2(16)	4/2(18)	2/0(6), 3/0(12)	2/0(1), 3/0(17)
4	5(17)	5(18)	3(17)	3(18)
5	5(17)	5(18)	5(17)	5(18)

The tritonymphs from Elizabeth Reef and Loadstone Reef are characterised by: Idiosoma 205-229 long. Ventral plates separated. GP separate from AP. AE with 1 pair of adjunct setae; PE with 0-1 adjunct setae. GP with 2 pairs of pgs, 1 pair of sgs. Leg chaetotaxy from trochanter to tarsus (rare variants in parentheses): leg I, 1, 2, (4-)5, 5, 5, 3; leg II, 1, 2, (4-)5, 5, 5, 3; leg III, 1, 2, 2, 3, 5, 4; leg IV, 0, 2, 2, 3, 5, 3. Telifemora I-IV with (2/2) 3/2, (3/1) 3/2, 2/0, 2/0 dorsal/ventral setae. Two basal setae on tarsus III adjacent. Edge of claws 8 wide, with approximately 15 tines.

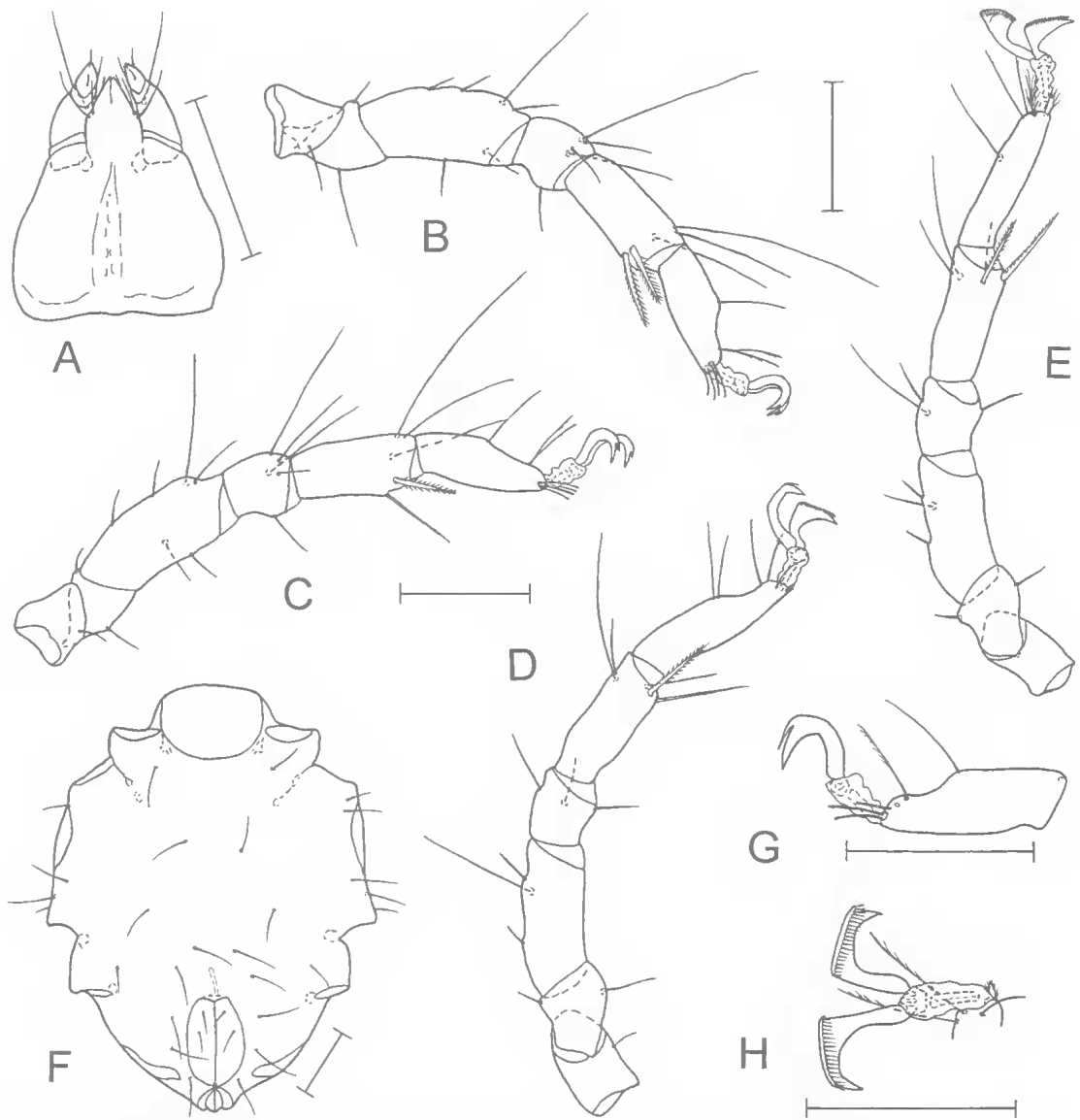


FIG. 15. *Rhombognathus papuensis* Bartsch; A, gnathosoma, ventral, male; B, leg I, medial, male; C, leg II, medial, male; D, leg III, medial, male; E, leg IV, ventromedial, male; F, idiosoma, ventral, female; G, tarsus I, lateral, female (medial claw and setae omitted); H, tip of tarsus III, medial, female. Scale bar = 50 μ m.

The specimens from the Great Barrier Reef differ slightly from those from Papua New Guinea (Bartsch, 1989a). In the specimens from Papua, the setae on the PD insert further posterior, and the wedges between GP and AP seem to be larger than in adults from the Great Barrier Reef. Unless more material will prove the opposite, the individuals from Magnetic Island, Elizabeth Reef and Loadstone Reef are considered as conspecific with *R. papuensis*.

The individuals recorded from the Indian Ocean (Chatterjee, 1995) are not conspecific with *Rhombognathus papuensis*. According to the description of that species, the OC are much wider than in *R. papuensis* and the PD bears 2 pairs of setae (Chatterjee, 1995: Fig. 1).

DISTRIBUTION. New Guinea, 10°S, 148°E, shallow water (Bartsch, 1989a) and Great Barrier Reef, from shallow water to 10m depth.

Rhombognathus reticulifer sp. nov.
(Figs 16, 17)

ETYMOLOGY. For the dorsal plates which bear (*ferre*, Latin) a *reticulum* (Latin).

MATERIAL. HOLOTYPE. ♂ (MTQ), Great Barrier Reef, 19°20.12'S, 149°02.85'E, Elizabeth Reef, large chunks of coral rubble at 10m, 24 December 1997; coll. J.C. Otto. PARATYPES. 2♀ (MTQ), collection data as above. ♀, ♂ (QM S50969), collection data as above. ♀, 1♂ (ZMH A101/99), collection data as above. ♂ (IB), collection data as above. OTHER MATERIAL. 7♀, 2♂, 2 tritonymphs (IB), Great Barrier Reef, 19°20.12'S, 149°02.85'E, Elizabeth Reef, *Halimeda* (Chlorophyta) at 15m, 24 December 1997; coll. J.C. Otto.

DESCRIPTION. *Male*. Idiosoma slender, 186-205 long; holotype 203 long, 132 wide. Dorsal plates coarsely reticulated (Fig. 16A); meshes 8-10 long and faintly subdivided. Plates with delicate pores. AD 62 long, 65 wide. Anterior margin arched, posterior margin broadly rounded. Transverse series of muscle scars level with 0.80. OC 54 long, 30 wide. Each plate with 2 small corneae, 2 gland pores in lateral margin and pore canaliculus halfway between gland pores. PD 105 long, 62 wide; not as wide as AD. Plate evenly reticulated; meshes 8-11 long. Posterolateral portions of PD hardly projecting beyond median portion of plate. Pair of gland pores in posterolateral margin of PD. Anal sclerites extending beyond anal valves. Setae ds-1 40 long, inserted on AD. Setae ds-2 and ds-3 on OC; ds-3 at 0.51. PD with single pair of setae, inserted at 0.25 and 0.29.

Ventral plates AE, PE, GP and AP fused to a ventral shield (Fig. 16B). Shield delicately punctate. Area of AE with 1-2 adjunct setae; PE with 1 pair of adjunct setae. GO 28 long, 16 wide. GO extending to the level of insertion of leg IV. Perigenital setae arranged trapezoidally; holotype with 7 pairs of setae in a line and 1 pair of basilar setae near posterior edge of GO. Pgs plumose. Spermatopositor 37 long, 40 wide; extending beyond anterior pair of pgs (Fig. 16C).

Gnathosoma short; 57 long, 46 wide; 1.2 times longer than wide (Fig. 16D). Rostrum short, 22 long, triangular.

Legs I and IV almost equal in length, about 0.7 of length of idiosoma. Insertion of legs III and IV level with 0.56 and 0.71, respectively. Length: height ratio of telofemora I-IV 1.7, 1.7, 1.5, 1.6 (Figs 16E-H). Telofemora and tibiae of each leg almost equal in length. Tarsi III and IV only slightly longer than these legs' tibiae. Leg chaetotaxy, from trochanter to tarsus: leg I, 1, 2, 6, 5, 5, 3; leg II, 1, 2, 6, 5, 5, 3; leg III, 1, 1, 3, 3, 5, 4; leg IV, 0, 1, 3, 3, 5, 3. Lateral seta on each

basifemur II and III long, about twice height of these segments. Telofemora I-IV with 4/2, 4/2, 3/0, 3/0 setae. Dorsolateral seta on telofemur III hardly longer than the 2 dorsomedial setae. Ventral seta on genu I delicately pectinate. Tibiae I-IV with 2, 1, 1, 2 bipectinate ventral setae. Ventrolateral seta on both tibia II and III almost as long as ventromedial seta. Two basal setae on tarsus III inserted close together. On each of the tarsi 2 distalmost dorsal setae slightly plumose. Tarsus I with short papilliform famulus, 1 long; solenidion 7 long (Fig. 17A); ambulacrum flanked by pair of doubled pas (Fig. 17B). Apart from absence of famulus, tarsus II similar to tarsus I; solenidion 8 long (Fig. 17C). Medial pas on tarsus III setiform, lateral pas short, pectinate (Fig. 17D); pas on tarsus IV (Fig. 17E) more plumose than on tarsus III.

Carpites on tarsi I and II 5-6 long; carpites on tarsi III and IV 6-7 long. Accessory processes of claws widened; 4 wide, with 7-8 small tines (Figs 17D, E).

Female. Idiosoma 217-241 long. Areas with striated integument between plates larger than in males. Female PD somewhat shorter, ds-4 at 0.20-0.23 relative to length of PD. Ventral shield including AE, PE and GP; AP separated from ventral shield by wedges of striated integument (Fig. 17F). Anterior margin of GO not reaching the level of insertion of leg IV. Genital acetabula small, often obscured. Five pairs of pgs arranged in a wide ring around GO: 2 anterior pairs of pgs anterior to the level of insertion of leg IV. Genital spines claw-like, with median tooth and 4-5 smaller teeth along lateral margin. Genital sclerites with 2 pairs of sgs. Palps extending slightly beyond rostrum. Chelicera 70 long, 16 wide; dorsal margin of its claw dentate. Pas on tarsus III similar to male tarsus; pas on tarsus IV (Fig. 17H) less plumose than on male tarsus IV.

Tritonymph. Idiosoma 151-195 long. OC more narrow and PD shorter than in adults (Fig. 17I). Reticulate pattern same as in adults. Setae ds-1 long; setae ds-4 near anterior margin of PD. Ventral plates AE, PE, GP, and AP separated (Fig. 17J). Posteromedian margin of AE convex. AE and PE each with 1 pair of adjunct setae. Genital plate small; with 2 pairs of pgs and 1 pair of sgs. Gnathosoma short; 1.1 times longer than wide. Legs I and II with 1, 2, 4, 5, 5, 3 setae, from trochanter to tarsus; leg III with 1, 1, 2, 3, 5, 4 setae, and leg IV with 0, 1, 2, 3, 5, 3 setae. Telofemora I-IV with 3/1, 3/1, 2/0, and 2/0 setae.

Variations. Varieties of characters in adults: length of idiosoma, ♀: 217-241 (11); length of idiosoma, ♂: 186-205 (6); number of adjunct

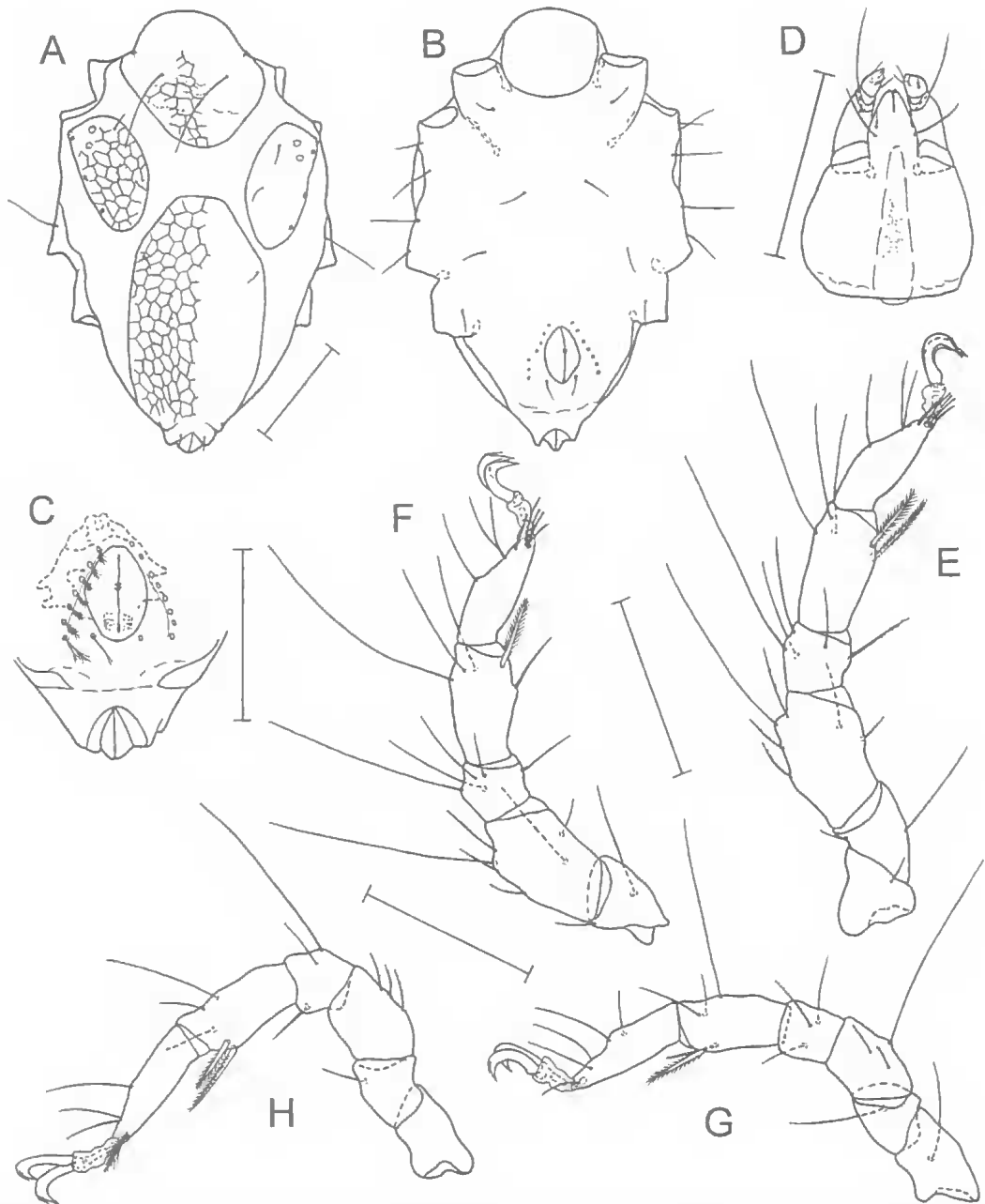


FIG. 16. *Rhombognathus reticulifer* sp. nov., male; A, idiosoma, dorsal; B, idiosoma, ventral; C, posterior portion of idiosoma, ventral; D, gnathosoma, ventral; E, leg I, medial; F, basifemur to tarsus II, medial; G, leg III, medial; H, leg IV, medial. Scale bar = 50 μ m.

setae on either side of AE: 1 (29), 2 (5); number of adjunct setae on PE: 0 (3), 1 (30), 2 (1); number of pgs on either side of GO, ♀: 5 (20), 6 (2); number of pgs plus basilar setae in either half, ♂: 7+1 (11), 8+1 (1); number of setae of leg segments 2 to 5:

segment	leg I	leg II	leg III	leg IV
2	2(34)	2(34)	1(34)	1(34)
3	3/2(4), 4/1(1), 4/2(29)	3/2(4), 4/2(30)	2/0(7), 2/1(1), 3/0(26)	2/0(9), 2/1(1), 3/0(24)
4	5(34)	5(34)	3(34)	3(34)
5	5(34)	5(34)	5(34)	5(34)

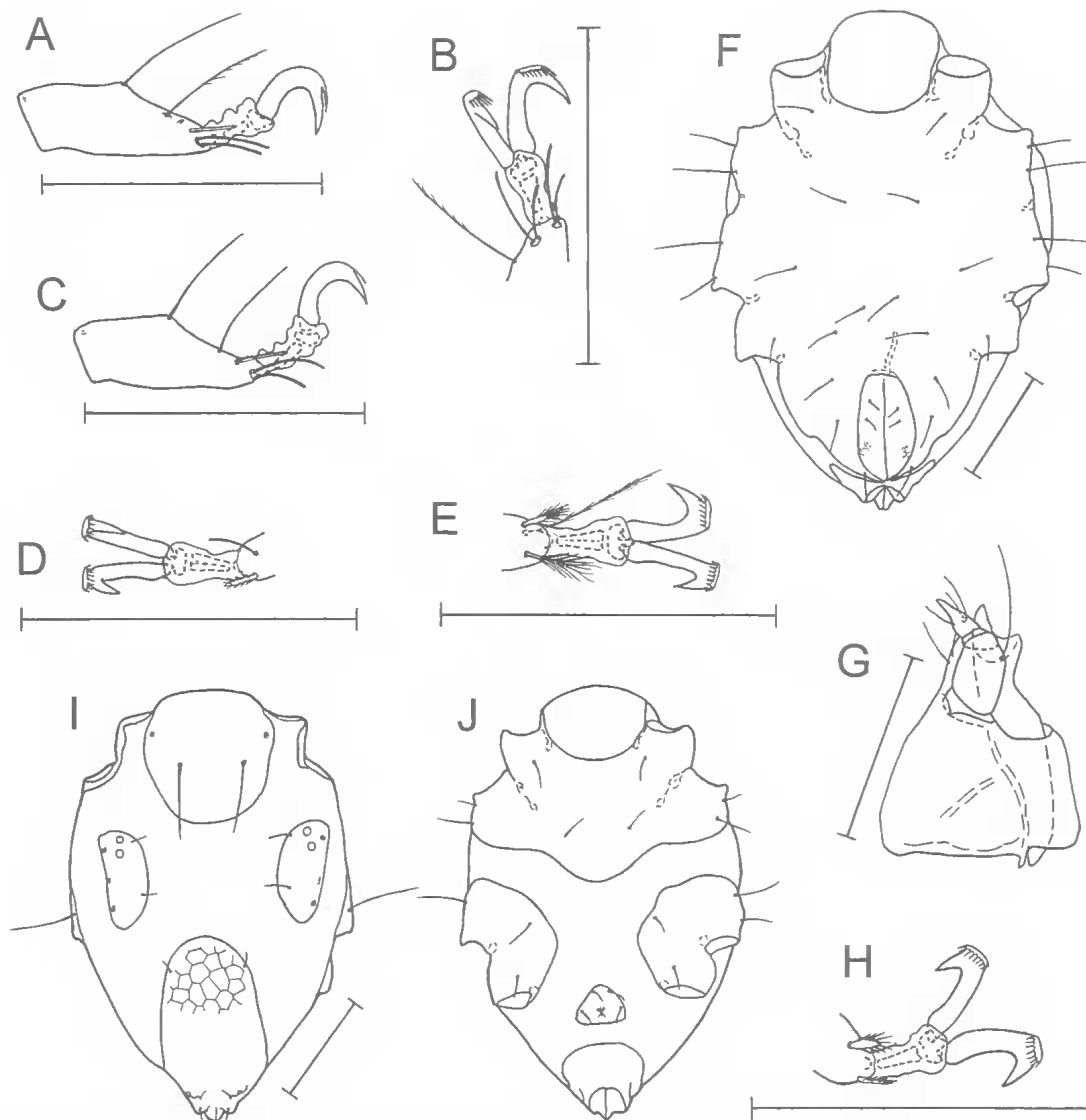


FIG. 17. *Rhombognathus reticulifer* sp. nov., A, tarsus I, lateral, male (medial claw and setae omitted); B, tip of tarsus I, ventromedial, male (dorsolateral fossary seta omitted); C, tarsus II, lateral, male (medial claw and setae omitted); D, tip of tarsus III, ventral, male (dorsal setae omitted); E, tip of tarsus IV, ventral, male (dorsomedial fossary seta omitted); F, idiosoma, ventral, female; G, gnathosoma, lateral, female; H, tip of tarsus IV, ventral, female (dorsal setae omitted); I, idiosoma, dorsal, tritonymph; J, idiosoma, ventral, tritonymph. Scale bar = 50 μ m.

REMARKS. *Rhombognathus reticulifer* is characterised by the combination: dorsal plates distinctly reticulated; ds-1 much longer than the succeeding setae; PD with single pair of setae; in males all ventral plates fused; females with wedges of striated integument between ventral shield and AP; area representing AE and PE generally with 1 adjunct seta on either side; males with 8 pairs of pgs, females with 5 pairs of pgs; gnathosoma short, 1.2 times longer than wide;

telofemora I-IV with 4/2, 4/2, 3/0, 3/0 setae; accessory process on claws slightly widened, with 7-8 tines.

Amongst the rhombognathines from the Great Barrier Reef, the species *R. levigatus* and *R. tericulus* sp. nov. (description below) are most similar to *R. reticulifer*. The smooth PD of *R. levigatus* is wider than in *R. reticulifer*, and the telofemora I to IV of *R. levigatus* bear 5/2, 5/2, 3/1, and 3/1 setae. Discriminating characters

between *R. reticulifer* and *R. tericulus* are outlined after the description of the latter species.

R. ventralis Newell, 1984 and *R. lateralis* Newell, 1984, both known from the South American Pacific coast (Newell, 1984), resemble *R. reticulifer* in general aspect. These two species have, in contrast to *R. reticulifer*, 4 setae on telofemur IV.

Rhombognathus scutulatus Bartsch, 1983

Rhombognathus scutulatus Bartsch, 1983: 413-415, figs 46-57.
Rhombognathus scutulatus Bartsch, 1993: 20, 21, fig. 1A-C;
Chatterjee, 1995: 284, figs 15-19.

MATERIAL. ♂ (MTQ), Great Barrier Reef, Cape Ferguson, AIMS beach, algae at low tide mark, 2 March 1997; coll. J.C. Otto. ♀, ♂ (QM S50970), collection data as before. ♂ (IB); collection data as before. ♀, ♂ (MTQ), Great Barrier Reef, Magnetic Island, Alma Bay, rocky littoral, algae at 0.5m, 16 March 1998; coll. J.C. Otto. 2 ♀, ♂ (IB); collection data as before.

DIAGNOSIS. Female idiosoma 300-335, male 285-310 long. Dorsal plates AD, OC and PD fused. Dorsal shield with foveate ornamentation. Dorsal idiosomatic setae subequal in size. Area representing PD with single pair of setae. Ventral plates AE, PE and GP fused in females and males; GP partly fused with AP. Areas of AE and PE each with 1 pair of adjunct setae. Female with 5 pairs of pgs and 2 pairs of sgs. Males with 9-13 pairs of trapezoidally arranged plumose pgs, 1 pair of basilar setae and 2 pairs of sgs. Gnathosoma 1.16 times longer than wide. None of the setae on genua I-IV pectinate. Telofemora I to IV with 4/2, 4/2, 3/0, 3/0 setae. Tarsi I-IV with 3, 3, 4, 3 dorsal setae. Apical fossary setae with their distal portion flattened, pilose. Accessory process of claws widened; claw with 22-24 tines.

Variations. Varieties of characters in adults: length of idiosoma, ♀: 300-335 (4); length of idiosoma, ♂: 285-310 (5); number of adjunct setae on either side of AE: 0 (1), 1 (17); number of adjunct setae on PE: 1 (17), 2 (1); number of pgs on either side of GO, ♀: 5 (8); number of pgs on either side plus basilar setae, ♂: 9+1 (2), 10+1 (3), 11+1 (2), 12+1 (1), 13+1 (2); number of setae of leg segments 2 to 5:

segment	leg I	leg II	leg III	leg IV
2	2(18)	2(18)	2(18)	2(18)
3	4/2(18)	4/2(17), 4/3(1)	2/0(1), 3/0(17)	2/0(1), 3/0(17)
4	5(18)	5(18)	3(17), 4(1)	3(18)
5	5(18)	5(18)	5(18)	5(18)

REMARKS. In the samples from the Great Barrier Reef area, *Rhombognathus scutulatus* is the only species with a dorsal shield.

DISTRIBUTION. Philippines; eastern and western coast of India; Western Australia (Bartsch, 1983, 1993; Chatterjee, 1995). Found in a variety of tidal and shallow subtidal algal substrata.

Rhombognathus seminotatus sp. nov. (Figs 18, 19)

ETYMOLOGY. For the sculpturing of the PD with half (*semi*, Latin) of the plate being ornamented (*notatus*, Latin).

MATERIAL. HOLOTYPE. ♂ (MTQ), Great Barrier Reef, Cape Ferguson, AIMS beach, algae at low tide mark, 2 March 1997; coll. J.C. Otto. OTHER MATERIAL. ♀, ♂ (MTQ), Great Barrier Reef, Magnetic Island, Alma Bay, rocky littoral, algae at 0.5m, 16 March 1998; coll. J.C. Otto. ♀, ♂ (QM S50971), collection data as above. ♀ (ZMH A102/99), collection data as above. 2 ♀, 2 ♂ (IB), collection data as above.

DESCRIPTION. *Male.* Idiosoma slender 278-313 long; holotype 278 long, 161 wide. AD 100 long, 82 wide. Anterior and posterior margin broadly rounded. Median portion with reticulate ornamentation; anterior, lateral and posterior portions smooth (Fig. 18A); lateral areas pierced by minute pores. Transverse line of muscle scars at 0.78. OC 75 long, 48 wide; with 2 corneae; gland pores in lateral margin. PD 130 long, 85 wide. Posterolateral cones of PD hardly extending beyond posteromedian margin of the plate; each cone with a gland pore. Median and posterolateral portions of PD reticulate; costae slightly raised, smooth apart from minute pores. Anterior portion of PD in holotype almost smooth; in other specimens that portion covered by delicate epicuticular reticulum (Fig. 18C). Anal valves not extending beyond anal sclerites. Setae ds-1 30 long, inserted on AD at 0.50. Succeeding setae 15 long; posterior seta on OC in posterior half of the plate. PD with single pair of setae at 0.28. Adanal setae on anal valves.

Ventral plates AE, PE, GP, and AP fused to a ventral shield (Fig. 18B); shield 218 long. Areas representing AE and PE each with a pair of adjunct setae. GO extending anteriorly far beyond the level of insertion of leg IV. GO 45 long, 21 wide. Distance to end of anal cone equalling length of GO. Perigenital setae arranged trapezoidally, 12 and 14 plumose setae in line and 1 pair of basilar setae at the level of 0.8 relative to length of GO (Fig. 18D). Genital sclerites with 2 pairs of sgs. Spermatopositor 62 long, 62 wide; extending beyond anterior pair of pgs.

Gnathosoma short, 71 long, 57 wide; length: width ratio 1.24 (Fig. 18E). Tectum slightly arched

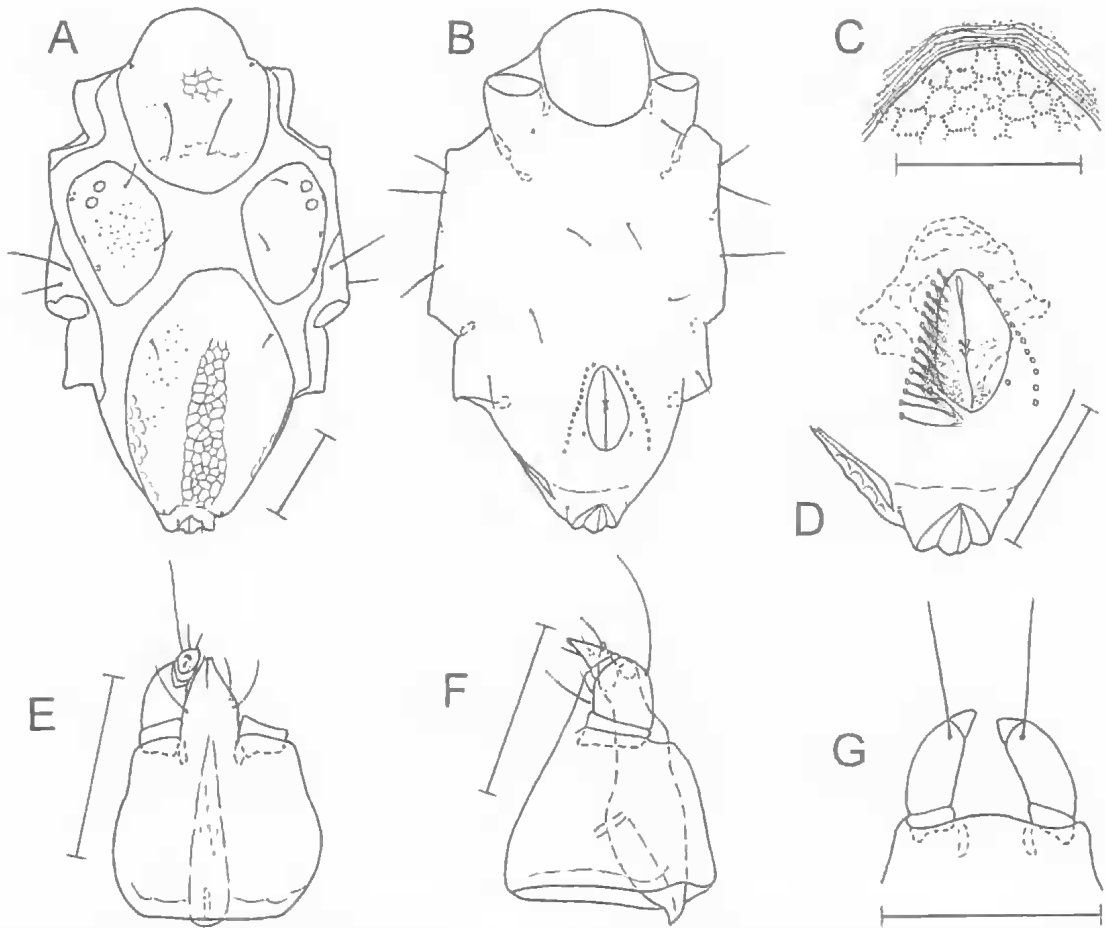


FIG. 18. *Rhombognathus seminotatus* sp. nov., male; A, idiosoma, dorsal; B, idiosoma, ventral; C, anterior portion of PD; D, posterior portion of idiosoma, ventral; E, gnathosoma, ventral; F, gnathosoma, lateral; G, tectum and P-1 to P-3, dorsal. Scale bar = 50 μ m.

(Fig. 18G). Rostrum 25 long; apex pointed. Palps short, appressed to the rostrum. P-4 directed ventrad (Fig. 18F), generally obscured in dorsal aspect (Fig. 18G).

Legs approximately 0.8 times of length of idiosoma. Insertion of leg I at 0.12, that of leg IV at 0.72 relative to length of idiosoma. Telfemora I-IV 2.5, 2.4, 2.3, and 2.3 times longer than high. Telfemora I and II markedly longer than tibiae I and II, respectively (Fig. 19A, B), telfemora III and IV somewhat longer than these legs, tibiae (Figs 19C, D). Tarsi I and II approximately as long as tibiae I and II; tarsi III and IV longer than tibiae. Leg chaetotaxy: leg I, 1, 2-3, 5-6, 5, 5, 3; leg II, 1, 2, 6, 4-5, 5, 3; leg III, 1, 2, 3-4, 2-3, 5, 4; leg IV, 0, 2, 3, 3, 5, 3. None of ventrolateral setae on genua bipectinate. Tibiae I-IV with 2, 1, 1, 2 bipectinate setae. On tibia IV ventromedial seta

smaller than ventrolateral one. Paired dorsal setae of tarsi slightly plumose. Tarsus III with 4 dorsal setae: the 2 basal ones inserted adjacent. Solenidia on tarsi I and II 9 and 11 long, respectively. Famulus on tarsus I papilliform, 2 long (Fig. 19F). Tarsi I (Fig. 19E) and II each with pair of doubled pas. Medial pas on tarsus III setiform, lateral pas spiniform, bipectinate. Medial pas on tarsus IV long, plumose (Fig. 19H).

Tarsi I and II each with 9-10 long carpite; tarsi III and IV with 12 long carpite. Claws distally widened, with 12-13 tines. End of claw clearly set off from line with tines.

Female. Idiosoma 310-322. Striated integument between dorsal plates wider than in males. AE, PE and GP fused to a ventral shield. Narrow striated integument separates anal plate from ventral shield. GO 67 long, 45 wide; extending to

the level of insertion of leg IV. Seven to nine pairs of pgs arranged in a wide ring around GO (Fig. 191); anterior pair of pgs level with insertion of leg IV. Genital sclerites with 2 pairs of sgs.

Variations. Several individuals from Magnetic Island have the dorsal plates covered by an epicuticular reticulum, the reticulum formed by delicate droplets (Fig. 18C).

Varieties of characters in adults: length of idiosoma, ♀: 310-322 (4); length of idiosoma, ♂: 278-313 (5); number of adjunct setae on either side of AE: 1 (20); number of adjunct setae on PE: 0 (3), 1 (17); number of pgs on either side of GO, female: 7 (3), 8 (4), 9 (3); number of pgs plus basilar setae in either half, male: 10+1 (1), 11+1 (5), 12+1 (2), 13+1 (1), 14+1 (1); number of setae of leg segments 2 to 5:

segment	leg I	leg II	leg III	leg IV
2	2(17), 3(1)	2(18)	2(18)	2(18)
3	2/1(1), 4/1(1), 4/2(15)	4/2(18)	2/0(3), 3/0(14), 3/1(1)	2/0(1), 3/0(17)
4	5(18)	4(1), 5(17)	2(1), 3(17)	3(17), 4(1)
5	5(18)	5(18)	5(18)	5(18)

REMARKS. *Rhombognathus seminotatus* is characterised by the distally widened claws bearing 12-13 tines. Other characters are: AE and PE each with pair of adjunct setae; females with 7-9 pairs of pgs, males with 11-15 pgs; telofemora I-IV with 4/2, 4/2, 3/0, 3/0 setae. In the majority of species the 2 basal setae on tarsus III insert immediately adjacent.

The majority of congeners of the Great Barrier Reef area have claws which are smooth or have an accessory process with 0-8 tines, other species have distally widened claws with more than 15 tines (*R. papuensis*, *R. scutulatus*), whereas *R. seminotatus* has 12-13 tines. Widened claws are present also in the eastern Pacific species *R. atuy* Abé, 1990, *R. guamensis* Bartsch, 1989, and *R. sinensoideus* Bartsch, 1992, recorded from Hokkaido, Guam, New Guinea, and southern China, respectively (Abé, 1990; Bartsch, 1989a, 1992). In contrast to *R. seminotatus*, the PD of both *R. atuy* and *R. sinensoideus* has 2 pairs of setae. The claws of *R. guamensis* have unusually wide tines, evidently wider than in *R. seminotatus*. *R. insularis* Bartsch, 1989, a species from islands of the Hawaii Archipelago (Bartsch, 1989a) and *R. lateralis* Newell, 1984, recorded from South America (Newell, 1984), also have claws similar to those of *R. seminotatus*. The three species can be distinguished on the basis of the setation of the telofemora I to IV; in *R. insularis* there are 5/2, 5/2, 3/1, 3/1 dorsal/ventral

setae, in *R. seminotatus* 4/2, 4/2, 3/0, 3/0 setae, and, according to Newell (1984), the setal formula of the telofemora I-IV in *R. lateralis* is 6, 6, 3-4, 4.

Females of *R. seminotatus* can be rapidly discriminated from congeners on the basis of the combination of: GA with 7-9 pairs of pgs; AE, PE and GP fused to a ventral shield; and claws with approximately 12 tines. The other rhombognathine species from the Great Barrier Reef area have 5 pairs of perigenital setae. A high number of perigenital setae, similar to that in *R. seminotatus*, is present in the Subantarctic species *R. auster* Bartsch, 1989b and *R. darwini* Newell, 1984, the eastern Pacific *R. ellipticus* Bartsch, 1977, and the northeastern Atlantic *R. procerus* Bartsch, 1975b, but none of these species have claws with a widened accessory process bearing more than 10 tines.

Rhombognathus tericulus sp. nov. (Figs 20, 21)

ETYMOLOGY. *Tericulus*, an anagram of *reticulus* which refers to the reticulate ornamentation of the dorsal plates.

MATERIAL. HOLOTYPE. ♂ (MTQ), Great Barrier Reef, 18°25.25' S, 146°40.65' E, Bramble Reef, chunks of coral rubble, 3-6m, 10 April 1998; coll. J.C. Otto. PARATYPES. ♀, ♂ (QM S50972), collection data as above. 2♂ (MTQ), collection data as above. OTHER MATERIAL. ♀ (MTQ), Great Barrier Reef, 19°20.12' S, 149°02.85' E, Elizabeth Reef, coarse sand and rubble, 3m, 25 December 1997; coll. J.C. Otto. ♂ (QM S50973), same collection data as before. ♂ (WAM 99/1447), same collection data as before. ♀, ♂ (IB), same collection data as before. 2♀, ♂, 1 tritonymph (IB), Great Barrier Reef, 18°41.91' S, 147°06.49' E, Loadstone Reef, coarse sand and rubble at 2m, 12 April 1998; coll. J.C. Otto. ♀ (IB), Great Barrier Reef, 18°42.05' S, 147°05.98' E, Loadstone Reef, coarse sand and rubble, 8m, 12 April 1998; coll. J.C. Otto. 2♀ (MTQ), Great Barrier Reef, 14°36' S, 145°38' E, Yonge Reef, coarse sand and rubble, 9m, 10 October 1998; coll. J.C. Otto. ♀, ♂ (ZMH A103/99), collection data as before. 2♀, ♂ (IB), collection data as before.

DESCRIPTION. *Male*. Idiosoma 205-223 long; holotype 220 long, 143 wide. Dorsal plates conspicuously reticulated (Fig. 20A). AD 75 long, 75 wide; reticulation of anterior portion of plate indistinct; posterior line with muscle scars inserted at 0.72. OC 68 long, 42 wide; distinctly projecting beyond posterior gland pore. PD 127 long, 82 wide; prominent reticulation uniformly covering the plate. Posterior margin of PD not extending beyond anal cone. Setae ds-I very long, approximately 40; inserted in anterior half of AD and close to the level of gland pores.

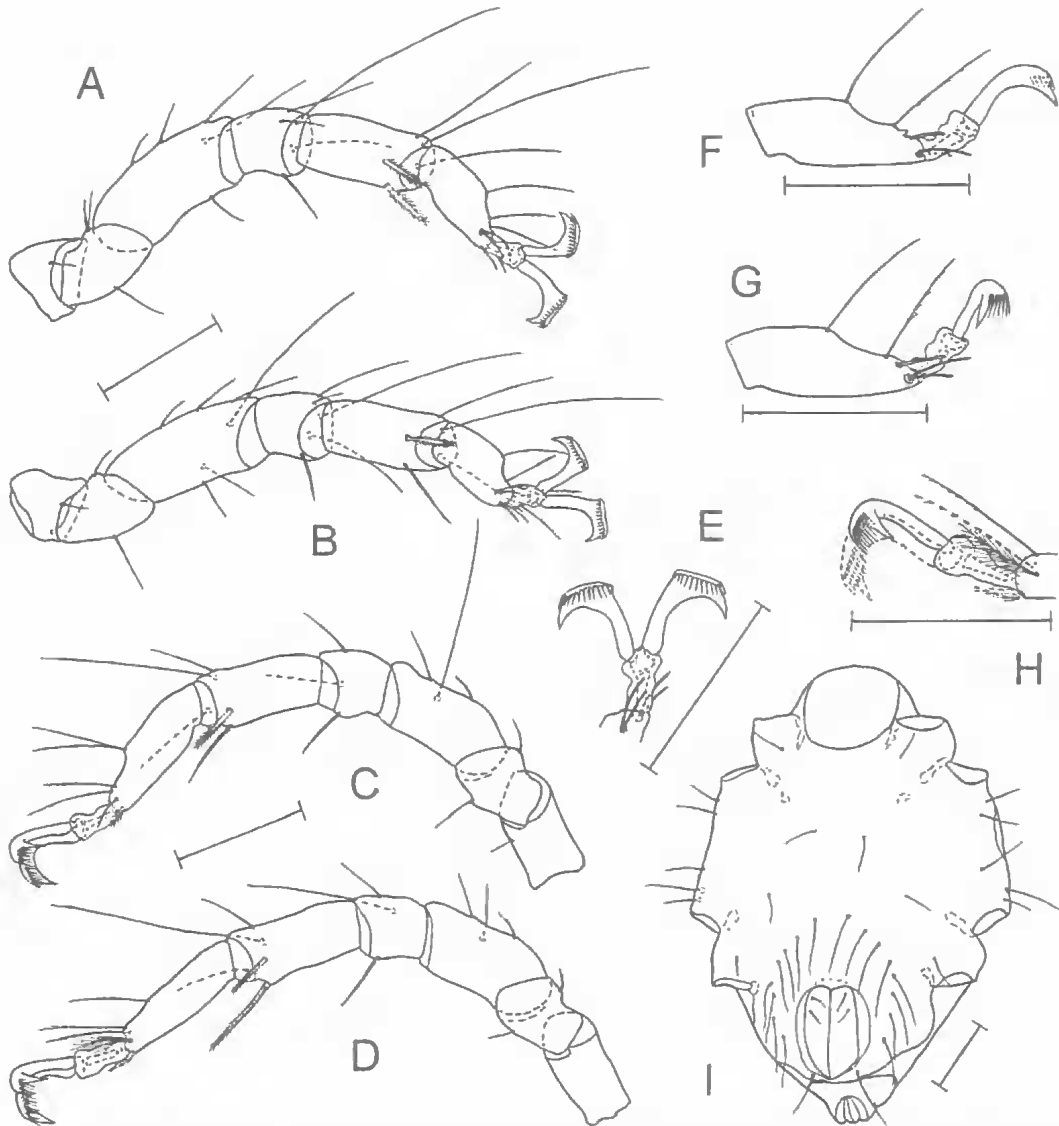


FIG. 19. *Rhombognathus seminotatus* sp. nov.; A, leg I, ventromedial, male; B, leg II, ventromedial, male; C, leg III, medial, male; D, leg IV, medial, male; E, tip of tarsus I, ventral (dorsal setae omitted); F, tarsus I, lateral, male (medial claw and setae omitted); G, tarsus II, lateral, male (medial claw and setae omitted); H, tip of tarsus IV, medial, male (lateral setae and claw dashed); I, idiosoma, ventral, female. Scale bar = 50 μ m.

Following setae 10-12 long. Setae ds-4 on PD at 0.37. Adanal setae on anal plate.

Ventral plates AE, PE and GA fused (Fig. 20B). Area of AE and PE each with one pair of adjunct setae. Marginal setae long. GO 30 long, 19 wide; distance to apex of anal cone more than length of GO. On either side of GO line with 8 plumose pgs and 1 basilar seta; the latter inserted anterior to posterior end of GO (Fig. 20E). Spermatopositor 32 long, 39 wide.

Gnathosoma short, 65 long, 52 wide. Rostrum 27 long. Tectum truncate (Fig. 20C). Chelicera 70 long; its claw wide, cutting edge serrate (Fig. 20D). Palps short.

Four pairs of legs subequal in length and approximately 0.7 of length of idiosoma. Legs III and IV inserted at 0.56 and 0.71, respectively. Telofemora I-IV 1.3-1.4 times longer than high. Telofemora I and II slightly longer than tibiae of these legs; telofemora III and IV slightly shorter

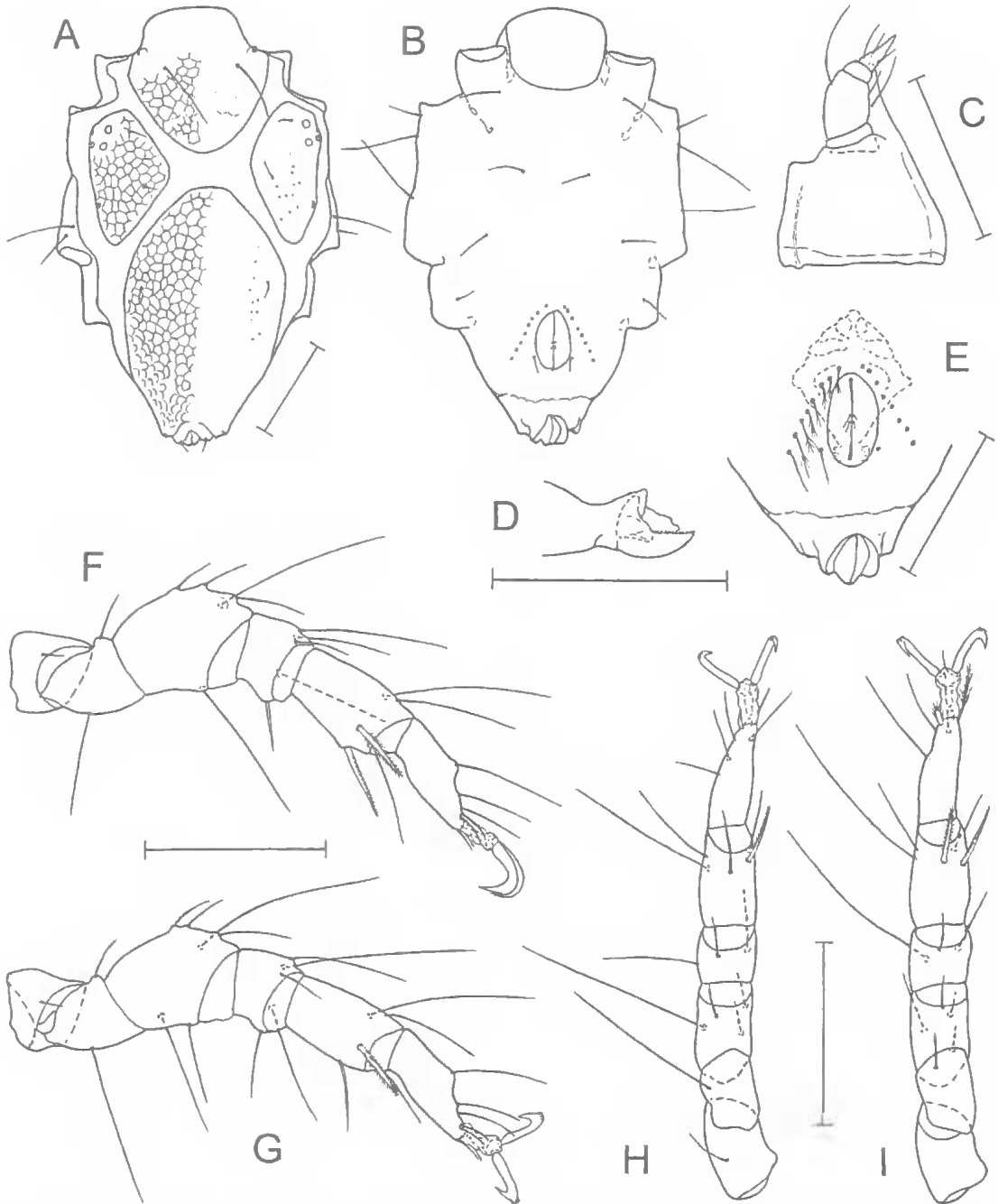


FIG. 20. *Rhombognathus tericulus* sp. nov., male; A, idiosoma, dorsal; B, idiosoma, ventral; C, gnathosoma, lateral; D, tip of chelicera; E, posterior portion of idiosoma, ventral; F, leg I, ventromedial; G, leg II, ventromedial; H, leg III, ventral; I, leg IV, ventral. Scale bar = 50µm.

than tibiae. Leg chaetotaxy, from trochanter to tibia: leg I, 1, 2, 5, 5, 5, 3; leg II, 1, 2, 6, 5, 5, 3; leg III, 1, 1, 4, 3, 5, 4; leg IV, 0, 1, 4, 3, 5, 3. Telofemora I-IV with 4/1, 4/2, 3/1, 3/1 setae (Fig.

20F-I). Tibiae I-IV with 2, 1, 1, 2 bipectinate ventral setae. Distal pair of fossary setae delicately plumose. As in female, solenidion on tarsus I setiform, 7 long; famulus 1 long (Fig.

21E). Tarsi I and II each with pair of doubled pas. Lateral pas on tarsi III and IV flattened, pectinate; medial pas on tarsus III setiform, on tarsus IV plumose (Fig. 21A).

Carpites on tarsi I and II 5 long, on tarsi III and IV 6 long. Accessory process on each of claws widened and with 3-4 minute tines (Fig. 21A).

Female. Idiosoma 205-260 long. In dorsal aspect similar to male. Ventral plates AE, PE and GP fused; GP and AP laterally separated by wedges of striated integument (Fig. 21B). With 5 pairs of pgs; 2 anterior pairs positioned anterior to GO. GO 52 long. Genital sclerites with 2 pairs of sgs. Ovipositor with 5 pairs of genital spines, 7-11 long and ending with 5-6 tines (Fig. 21C). Length:width ratio of gnathosoma 1.23. Rostrum shorter than gnathosomal base (Fig. 21D). On tarsus IV, lateral pas flattened and pectinate, medial pas setiform (Fig. 21F).

Tritonymph. Idiosoma 204 long. Ornamentation of dorsal plates foveate rather than reticulate (Fig. 21G). Posterior margin of AD truncate, ending immediately posterior to line of muscle scars. OC and PD smaller than in adults. Ventral plates separated; GP and AP not fused (Fig. 21H). Posterior margin of AE convex. AE and PE each with pair of adjunct setae. GP with 2 pairs of pgs and 1 pair of sgs. Number of setae of trochanter to tibia of legs I and II: 1, 2, 4, 5, 5; of legs III and IV 1, 1, 4, 3, 5, and 0, 1, 2, 3, 5. Telofemora I-IV with 3/1, 3/1, 3/1, and 2/0 setae, respectively.

Variations. Varieties of characters in adults: length of idiosoma, ♀: 205-260 (10); length of idiosoma, ♂: 205-223 (8); number of adjunct setae on either side of AE: 0 (1), 1 (36), 2 (2); number of adjunct setae on PE: 1 (38), 2 (2); number of pgs on either side, of GO ♀: 5(20); number of pgs plus basilar setae in either half, ♂: 6+1 (1), 7+1 (7), 8+1 (11), 9+1 (1); number of setae of leg segments 2 to 5:

segment	leg I	leg II	leg III	leg IV
2	2(40)	2(40)	1(40)	1(39), 2(1)
3	3/1(6), 4/1(34)	3/2(3), 4/1(8), 4/2(27)	3/0(2), 3/1(38)	2/1(2), 3/1(37), 4/1(1)
4	5(40)	5(40)	2(1), 3(39)	3(40)
5	5(40)	5(40)	5(40)	5(40)

REMARKS. *Rhombognathus tericulus* closely resembles *R. reticulifer*. In both species the PD is reticulate, the ds-1 are very long, AE and PE each have 1 pair of adjunct setae, the anal cone is of normal size, the gnathosoma is short, the leg chaetotaxy is rather similar, the distally widened apex of the claws bears few small tines. Differences are: *R. tericulus* has a more prominent

reticulation, its PD is wider, the telofemora are shorter, the telofemora III and IV each have 3/1 dorsal/ventral setae, and there are only 3-4 tines on the apex of the claws. Tritonymphs of *R. tericulus* have a foveate PD, whereas the PD of *R. reticulifer* is reticulated; the GP of *R. tericulus* is larger than in *R. reticulifer*.

Both species are easily separated from similar-sized Indo-West Pacific species on the basis of the enlarged ds-1.

***Rhombognathus validipes* sp. nov.**
(Figs 22, 23)

ETYMOLOGY. For its strong (*validus*, Latin) legs (*pes*, Latin).

MATERIAL HOLOTYPE. ♀ (MTQ), Great Barrier Reef, 18°16.46'S, 147°22.88'E, Myrmidon Reef, dead coral overgrown with algae at 3-15m, 13 April 1998; J.C. Otto. **PARATYPES.** ♀ (QM 850974), collection data as above. ♀, 1 tritonymph (ZMH A104/99), collection data as above. **OTHER MATERIAL.** 1 tritonymph (MTQ), Great Barrier Reef, Undine Reef, off Cape Tribulation, growth on corals at 6m, 16 November 1997; coll. J.C. Otto. ♀ (IB), collection data as above.

DESCRIPTION. *Female*. Idiosoma 315-353 long, holotype 327 long, 217 wide. Dorsal plates separated from each other by wide areas of striated integument (Fig. 22A). AD 97 long, 105 wide; anterior margin broadly rounded, posterior margin ovate. Pair of gland pores in lateral margin. Line with muscle scars at approximately 0.7. OC slender, 75 and 85 long, 28 wide; lateral margin with 2 corneae and pore canaliculus; the latter closer to posterior than to anterior gland pore. OC with 2 corneae, the posterior one subdivided. PD 122 long. Integument within pair of slightly raised costae with delicate pores; median portion of plate with faint reticulate ornamentation. Pair of gland pores in posterolateral corners, the latter slightly extending beyond median margin of PD. Anal sclerites of normal size, not extended by anal valves. Setae ds-1 18 long; slightly wider and twice the length of the posterior setae; ds-1 inserted at 0.50 relative to length of AD. Setae ds-2 and ds-3 on OC, the posterior one at 0.64-0.68. Setae ds-4 and ds-5 on PD; anterior pair at 0.05, posterior seta at 0.47. Adanal setae on anal plate.

Ventral plates AE, PE and GP fused to a ventral shield; median portion of AP contiguous to ventral shield, else separated by pair of wide lateral wedges of striated integument (Fig. 22B). AE with 2-3 pairs of adjunct setae; PE with 2 adjunct setae. Distance from camerostome to GO

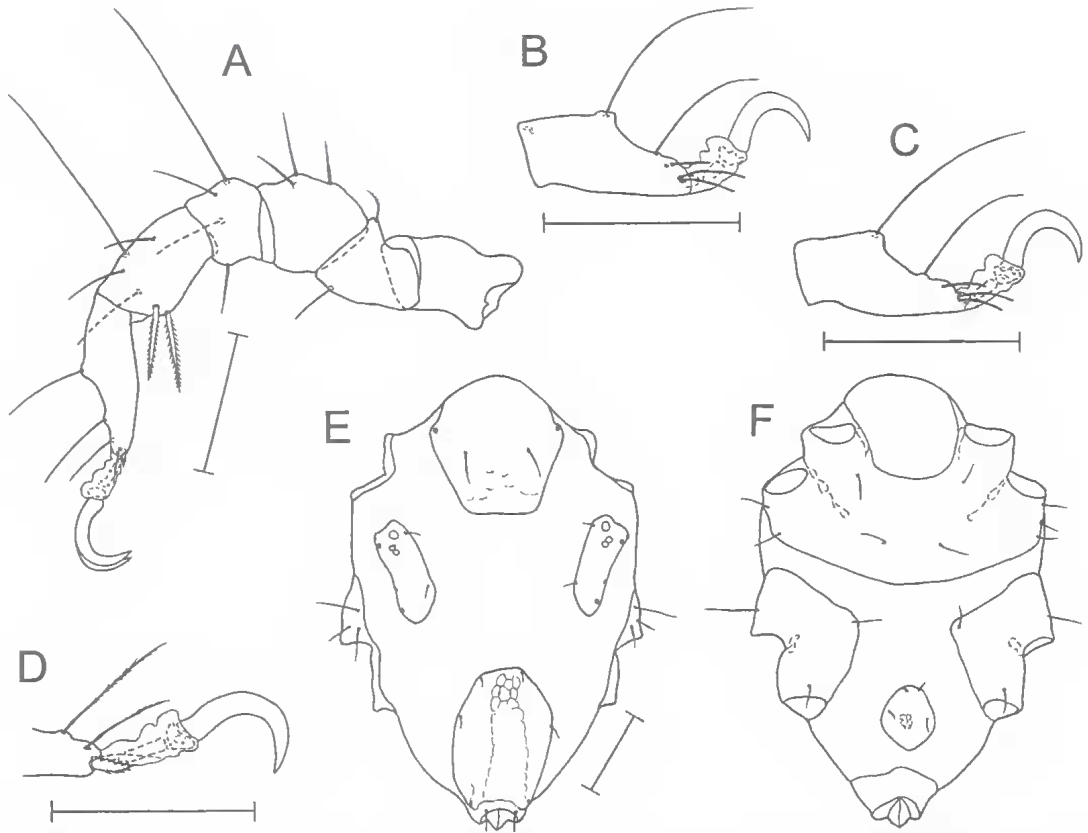


FIG. 21. *Rhombognathus tericulus* sp. nov.; A, tip of tarsus IV, ventrolateral, male (dorsomedial fossary seta omitted); B, idiosoma, ventral, female; C, ovipositor, lateral, and 3 genital spines (enlarged), female (spines of opposite side dotted); D, gnathosoma, ventral, female; E, tarsus I, lateral, female (medial claw and setae omitted); F, tip of tarsus IV, ventral, female (dorsal setae omitted); G, idiosoma, dorsal, tritonymph; H, idiosoma, ventral, tritonymph. Scale bar = 50 μ m.

165; GO 67 long. With 5 pairs of pgs, anterior pair of pgs at the level of insertion of leg IV. Genital sclerites with 2 pairs of sgs. Ovipositor with 10 pairs of genital spines (Fig. 22C); each spine trifold with equal-sized tines.

Gnathosoma 105 long, 77 wide, 1.36 times longer than wide. Gnathosomal base large (Fig. 22D). Rostrum 27 long, 20 wide, triangular in outline (Fig. 22E), much shorter than gnathosomal base. Rostrum with 2 pairs of maxillary setae and pair of long lateral rostral setae. Palps appressed to and slightly surpassing rostrum.

Legs stout; their length approximately 0.7 of that of idiosoma. Legs III and IV inserted at 0.54 and 0.68 relative to length of idiosoma. Telfemora I and II shorter than these legs' tibiae, telfemora III and IV slightly shorter than tibiae. Telfemora I and II 1.5 times longer than high (Fig. 22F, G); telfemora III and IV 1.1-1.2 times

longer than high (Figs 22H, 23A). Leg chaetotaxy: leg I, 1, 2, 7, 6-7, 7, 3; leg II, 1, 3, 7, 7, 3; leg III, 1, 2, 4, 3, 6, 4; leg IV, 0, 2, 3, 4, 6, 3. Telfemora I and II each with 5/2 dorsal/ventral setae, telfemora III and IV with 3/1 and 3/0 dorsal/lateral setae, respectively. Ventral seta on each of genua I-IV bristle-like, slightly serrate. Both ventral setae on each of tibiae I-IV stout and serrate or bipectinate. Tarsus III with 4 dorsal setae; the 2 basal setae distinctly separated. Basal fossary setae at basis of claw fossa; 2 apical fossary setae inserted within fossa area. On tarsi III and IV apicalmost (dorsolateral) fossary seta near tip of tarsi and resembling medial pas. Tarsi I and II each with dorsolateral solenidion, 10 and 12 long, respectively (Fig. 23B, C); apex with pair of doubled pas. Famulus on tarsus I papilliform. Tarsi III and IV each with setiform medial pas and scaliform pectinate lateral pas.

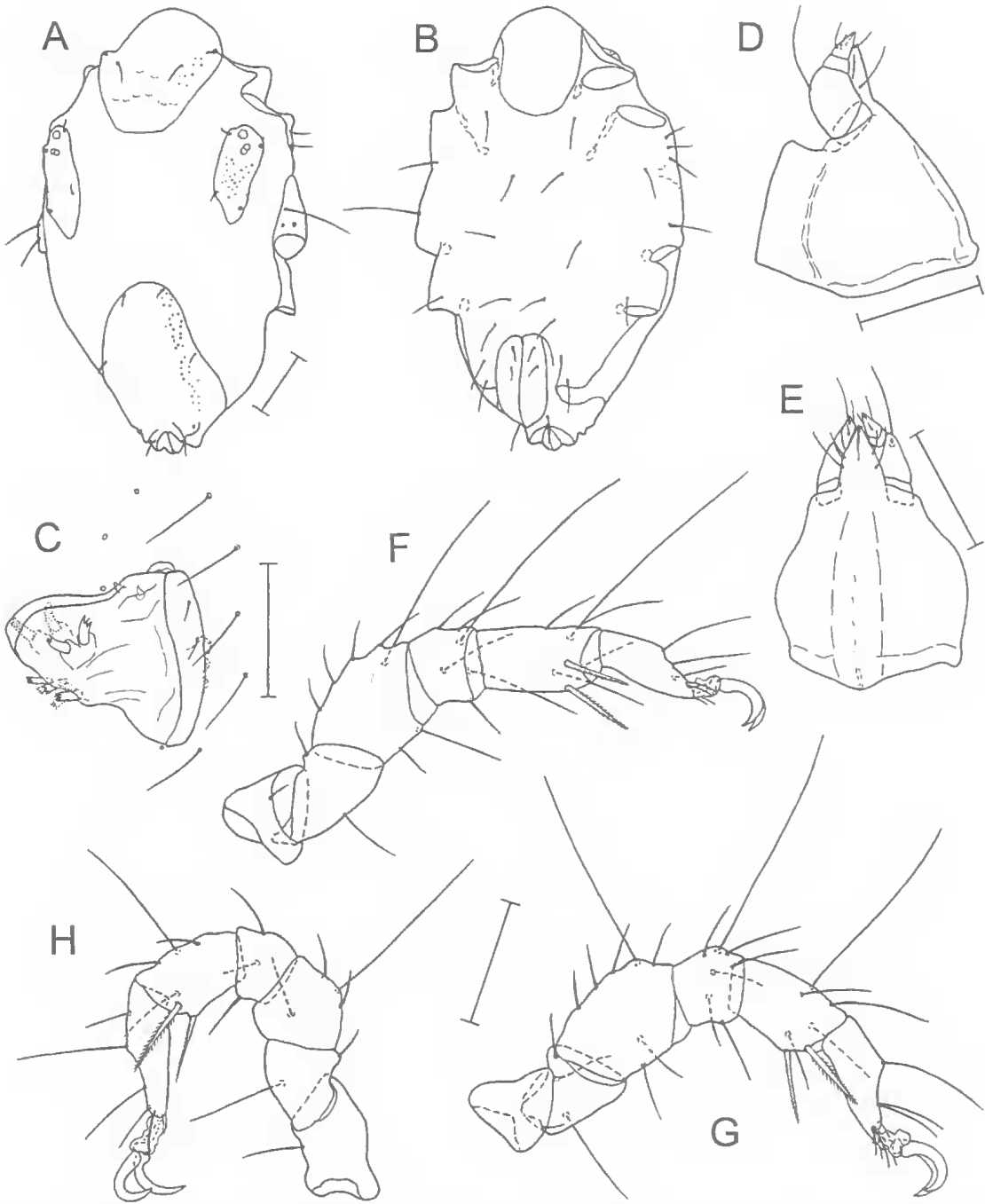


FIG. 22. *Rhombognathus validipes* sp. nov., female; A, idiosoma, dorsal; B, idiosoma, ventral; C, ovipositor, lateral (spines of opposite side dotted); D, gnathosoma, lateral; E, gnathosoma, ventral; F, leg I, ventromedial; G, leg II, medial; H, leg III, medial. Scale bar = 50µm.

Carpites of tarsi I-IV 6, 7, 10, 10 long. Claws smooth.

Tritonymph. Idiosoma 267-291 long, 173 wide. Posterior margin of AD more truncate than in female. OC slender as in female; posterior cornea

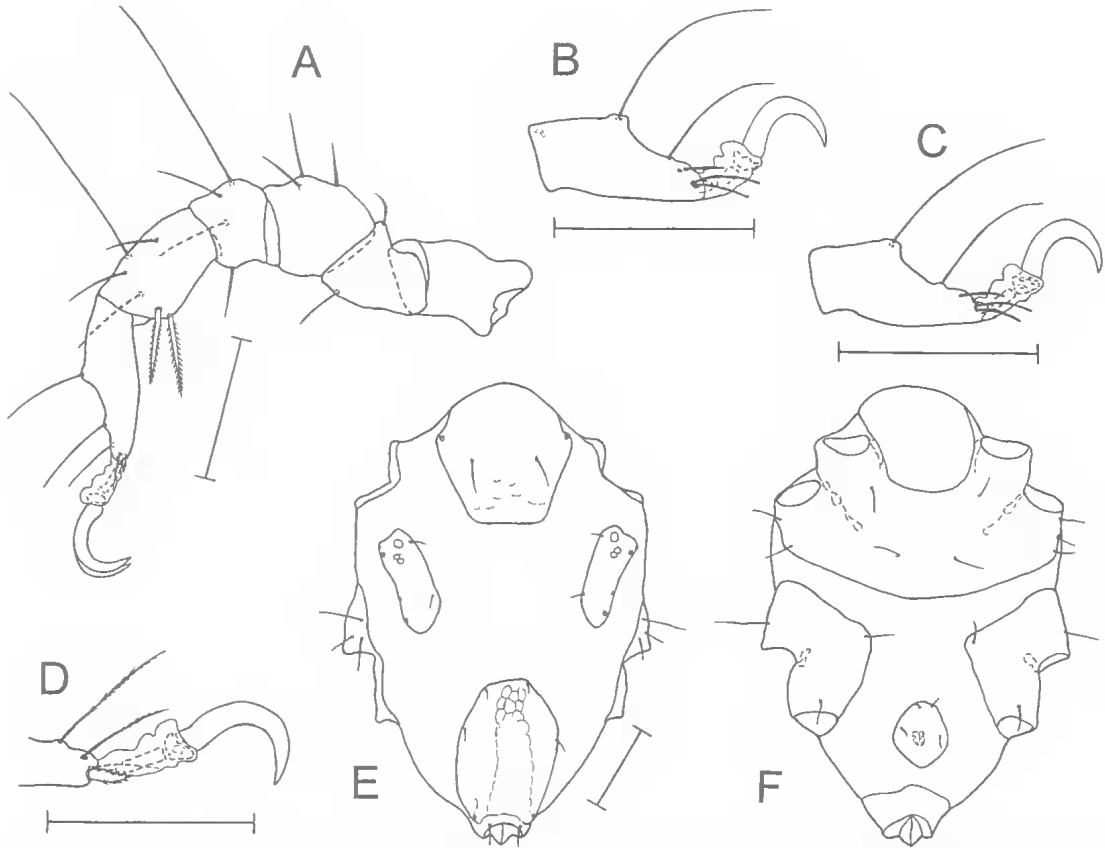


FIG. 23. *Rhombognathus validipes* sp. nov., female; A, leg IV, medial, female; B, tarsus I, lateral, female (medial claw and setae omitted); C, tarsus II, lateral, female (medial claw and setae omitted); D, tip of tarsus IV, lateral, female; E, idiosoma, dorsal, tritonymph; F, idiosoma, ventral, tritonymph. Scale bar = 50µm.

subdivided (Fig. 23E). Ventral plates AE, PE, GP, and AP separated. AE with 1-2 pairs of adjunct setae; PE each with 2 adjunct setae. GP ovoid (Fig. 23F); with 2 pairs of pgs and 1 pair of sgs. Three pairs of genital acetabula adjacent to primordial genital slit. Gnathosoma as in male. Leg chaetotaxy: leg I, 1, 2, 6, 7, 7, 3; leg II, 1, 3, 6, 7, 7, 3; leg III, 1, 2, 4, 3, 6, 4; leg IV, 0, 2, 3, 4, 6, 3. Telfemora I and II each with 4/2 dorsal/ventral setae, telfemora III and IV with 3/1 and 3/0 dorsal/lateral setae, respectively. Tibiae I-IV each with 2 stout ventral setae.

Variations. Varieties of characters in adults: length of idiosoma, female: 315-353 (4); number of adjunct setae on either side of AE: 2 (6), 3 (2); number of adjunct setae on PE: 1 (1), 2 (7); number of pgs on either side of GO, female: 5 (8); number of setae of leg segments 2, 4 and 5, and number of dorsal/ventral setae of telfemora I and II and dorsal/lateral setae of telfemora III and IV:

segment	leg I	leg II	leg III	leg IV
2	2(8)	3(8)	2(8)	2(8)
3	5/2(8)	5/2(8)	3/1(7)	3/0(8)
4	6(1), 7(7)	7(8)	3(7)	4(8)
5	7(8)	7(8)	6(7)	6(8)

REMARKS. Adults and juveniles of *Rhombognathus validipes* are characterised by the two pairs of setae on the PD, whereas the other species from the Great Barrier Reef have a single pair of setae.

In the rhombognathine fauna presently known from northeastern Australia, the two species *Rhombognathus lathridius* and *R. validipes* have smooth claws. *R. validipes* is larger than the psammobiont *R. lathridius*; its gnathosoma is wider and the adanal setae do not arise from small pedestals as in *R. lathridius*.

In dorsal and ventral aspect of the idiosoma and the outline of the gnathosoma and the claws, *R. validipes* resembles *R. leurodactylus* Krantz, 1976 and *R. robustus* Bartsch, 1977, both are

recorded from the eastern Pacific coast (Krantz, 1976; Bartsch, 1977). In contrast to the two latter species, the OC of *R. validipes* are more slender. Other characters which separate *R. validipes* from *R. leurodactylus* are: the number of setae of the telofemora I-IV – 5/2, 5/2, 3/1, 3/0 in *R. validipes*, but 3/2, 3/2, 2/1, 2/1 in *R. leurodactylus*; the number of perigenital setae in females, 5 pairs in *R. validipes*, no more than 3 pairs in *R. leurodactylus*. Tibiae I-IV of *R. robustus* bear 6, 6, 5, 5 setae, those of *R. validipes* 7, 7, 6, 6 setae.

KEY TO ADULT RHOMBOGNATHINES OF THE GREAT BARRIER REEF

- 1. Gnathosoma completely hidden beneath AD. OC wider than long; without seta. PD with 3 pairs of setae. Venter with small plates and large areas of striated integument (Fig. 1B) *Isobacterus ponapensis*
 Gnathosoma extending beyond anterior margin of idiosoma. OC longer than wide; with 2 setae. PD with 1-2 pairs of setae. Ventral AE and PE fused to ventral shield *Rhombognathus*

KEY TO ADULT RHOMBOGNATHUS

- 1. Plates AD, OC and PD separate 2
 All dorsal plates fused. Claws with more than 20 tines *scutulatus*
- 2. Anterior margin of AD evenly rounded (Fig. 2A). Anal plate without pedestals 3
 AD with minute frontal process. Adanal setae on small pedestals (Fig. 7A); gnathosoma 1.5 times longer than wide; telofemora I-IV with 5/2, 5/2, 3/1, 3/1 dorsal/ventral setae. Claws smooth *lathridius*
- 3. Telofemora I-IV with 4-5/1-2, 4-5/1-2, 3/0-1, 3/0-1 dorsal/ventral setae 4
 Telofemora I-IV with 2/1, 2/1, 2/0, 2/0 dorsal/ventral setae *cyrtonotus*
- 4. Claws widened and provided with more than 10 tines (Figs 15H, 19E) 5
 Claws smooth or with accessory process, the latter with 1-8 tines (Figs 5H, 17E). 6
- 5. Claws with 12-13 tines. Setae ds-1 longer than following setae (Fig. 18A); female with 7-9 pairs of pgs (Fig. 19I); male with 11-15 pairs of pgs. *seminotatus*
 Claws with 18-20 tines. Setae ds-1 hardly longer than following setae (Fig. 14A); female with 5 pairs of pgs (Fig. 15F); male with 10-14 pairs of pgs . . . *papuensis*
- 6. Length of ds-1 not exceeding twice length of following setae (Figs 4A, 9A) 7
 Setae ds-1 3-4 times longer than following setae (Figs 16A, 20A); anal valves not extending beyond anal sclerites; dorsal plates reticulate. 10
- 7. Telofemora I and II each with 4/1 dorsal/ventral setae. . . 8
 Telofemora I and II each with 5/2 dorsal/ventral setae . . . 9
- 8. Length:height ratio of telofemora 1.9-2.0; anal valves extending beyond small anal sclerites (Fig. 4C) *delicatulus*
 Telofemora slender, length:height ratio 2.5-2.9; anal cone of normal shape with anal valves and anal sclerites similar in size (Fig. 11C) *longipes*

- 9. OC 1.6 times longer than wide; two corneae equal in shape; PD with single pair of setae (Fig. 9A); claws with accessory process (Fig. 10A) *levigatus*
 OC slender, more than 2.5 times longer than wide; posterior cornea subdivided; PD with 2 pairs of setae (Fig. 22A); claws smooth (Fig. 23B) *validipes*
- 10. PD with large-sized, faint reticulum, its meshes 8-10µm long (Fig. 16A); telofemora I-IV with 4/2, 4/2, 3/0, 3/0 dorsal/ventral setae; claws with 7-8 minute tines (Figs 17B, E) *reticulifer*
 PD with conspicuous and dense reticulation (Fig. 20A); telofemora I-IV with 4/1, 4/2, 3/1, 3/1 dorsal/ventral setae; claws with 3-4 minute tines (Fig. 21A, F) *tericulus*

DISCUSSION

In the Great Barrier Reef area, 11 species of *Rhombognathus* and 1 of *Isobacterus* were found. Future collections will certainly result in records of more species. The number of *Rhombognathus* species is similar to that known from south-western Australia, viz. 10 species (Bartsch, 1993), and from the boreal and warm temperate northwestern Pacific, 11 species from Hokkaido (Abé, 1996) and 8 species from the Hong Kong area (Bartsch, 1992). The number of species of *Isobacterus* recorded from the north- and southwestern Pacific area is small. *Isobacterus ponapensis* is the first representative of this genus from the shores of Australia. The low number of records of *Isobacterus* may partly be due to the lack of collections from adequate habitats.

Species of *Rhombognathus* recorded from various regions of the Pacific and the tropical Indian Ocean are summarised in Table 1. The knowledge of the rhombognathine fauna in the Pacific and Indo-West Pacific region still is poor, and several of the published records are based on sporadic and short-time sampling activities with halacarids being just one of the accessory taxa. Accordingly, the data summarised in Table 1 far from completely mirror the number and distribution of the genus *Rhombognathus* in these geographic regions. The status of *Rhombognathus denticulatus* Sokolov, 1952 is not clear; the absence of a bipectinate seta on tibia III may be an evidence of close relationship to the genus *Isobacterus*.

Noteworthy is the low number of wide-spread species. *R. leurodactylus* obviously is an amphi-Pacific boreal species. The species was taken on the shores of Oregon/US (Krantz, 1976) and all around Hokkaido/Japan, here both on the coastlines influenced by subarctic water currents (Okhotsk Sea and Western North Pacific) and by the warm (subtropical) Kuroshio current (Japan Sea) (Abé, 1996). *R. sinensis* inhabits a wide

TABLE 1. (cont.)

Species	Geographical Area												References
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
<i>novaezelandicus</i> Bartsch, 1985									x				Bartsch, 1985
<i>oblongus</i> Bartsch, 1989							x						Bartsch, 1989a
<i>pacificus</i> Newell, 1984				x									Newell, 1984
<i>papuensis</i> Bartsch, 1989							x	x					Bartsch, 1989a, present paper
<i>placidus</i> Bartsch, 1993											x		Bartsch, 1993
<i>plumifer</i> Trouessart, 1889				x									Newell, 1984
<i>psammophilus</i> Bartsch, 1993											x		Bartsch, 1993
<i>reticulatus</i> Krantz, 1976	x												Krantz, 1976
<i>reticulifer</i> sp. nov.								x					present paper
<i>robustus</i> Bartsch, 1977			x										Bartsch, 1977
<i>scutulatus</i> Bartsch, 1983							x	x			x	x	Bartsch, 1983, 1993; Chatterjee, 1995; present paper
<i>semiarmatus</i> Bartsch, 1983							x						Bartsch, 1983
<i>seminotatus</i> sp. nov.								x					present paper
<i>semireticulatus</i> Bartsch, 1977			x										Bartsch, 1977
<i>setellus</i> Bartsch, 1992						x							Bartsch, 1992
<i>setifer</i> Bartsch, 1983							x						Bartsch, 1983
<i>similis</i> Bartsch, 1977			x									x?	Bartsch, 1977; Chatterjee, 1995
<i>sinensis</i> Bartsch, 1990					x	x							Bartsch, 1989a
<i>sinenoides</i> Bartsch, 1992						x							Bartsch, 1992
<i>tenuiformis</i> Abé, 1996					x								Abé, 1996
<i>tericulus</i> sp. nov.								x					present paper
<i>terminalis</i> Sokolov, 1952					x								Sokolov, 1952
<i>teurinus</i> Abé, 1996					x								Abé, 1996
<i>thalassinus</i> Bartsch, 1993											x		Bartsch, 1993
<i>validipes</i> sp. nov.								x					present paper
<i>ventralis</i> Newell, 1984				x									Newell, 1984
<i>verrucosus</i> Bartsch, 1992						x							Bartsch, 1992

range along the coast of Asia, from Hokkaido to Hong Kong (Abé, 1996; Bartsch, 1992). *R. scutulatus* is an Indo-West Pacific species; records are from the Philippines, eastern and western coast of India, Western Australia (Bartsch, 1983, 1993; Chatterjee, 1995) and, now, from eastern Australia. From the Indian Ocean, Chatterjee (1995) published a record of *R. similis* Bartsch, 1977, a species also known from the Galapagos Islands (Bartsch, 1977); because of differences in the arrangement of the perigenital setae in females, the eastern Pacific and Indian Ocean specimens may belong to different species. *R. papuensis* is known from Papua New Guinea (Bartsch, 1989a) and eastern Australia. Though often not identical species, there are close similarities between the rhombognathines of

northeastern Australia and the Philippines, e.g. *R. lathridius*/*R. caudiculus* and *R. cyrtonotus*/*R. cebuius*.

On the basis of data on the geography and ecology of rhombognathines, Bartsch (1982) concluded that within *Isobactrus* many of the species have a high tendency to tolerate environmental changes but a low speciation rate. In contrast, within *Rhombognathus* there seems to be a high evolutionary potential. Rather than tolerate a wide range in the environmental parameters, species genetically diversify, and when being brought into a new habitat, exposed to changing hydrographic or climatic challenges or biological interactions, new species evolve in the local scene. The large numbers of *Rhombognathus* may be the result of adaptations to the numerous niches in the Great Barrier Reef area.

In the material from the Great Barrier Reef Marine Park area at hand, a few individuals could not be identified, they demonstrated characters of two species, namely *R. delicatulus* and *R. tericulus*. Are these specimens extreme variants, separate species, or hybrids? Nothing is reported on genetic barriers, or hybridisation, between halacarid species sharing a habitat. In the course of the author's studies in the northern Atlantic, thousands of rhombognathines have been examined microscopically. The variation of characters is low, apart from a few anomalies, namely deformations, intersexes which showed characters of both males and females, or adults with unilaterally a leg form and setation equalling that of juveniles. Hybrid-like forms, with characters of two species, were not found. The rhombognathine fauna of the northern Atlantic includes the genera *Isobacetrus*, *Metarhombognathus*, *Rhombognathides* and *Rhombognathus*. From the Pacific and Indian Ocean only *Isobacetrus* and *Rhombognathus* are known. The genus *Rhombognathus* is characterised by a large number of different forms; there are species with a slender, elongate idiosoma, others are short and flattened; some species are small and cryptic, others very large; species have short legs with wide segments or the telofemora and tibiae are elongate and the legs almost as long as the idiosoma; the numbers of setae of the legs vary considerably. Beside the wide range of interspecific differences, the genus is characterised by a high intraspecific variability. In contrast to *Rhombognathus*, *Isobacetrus* demonstrates a considerable uniformity. The shape of the idiosoma and legs is rather similar in all species and even interspecific difference in the setation is small within the faunas of the northern and southern oceans, respectively.

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